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The American Journal of Public Health and the Nation's Health is published by the American Public Health Association, Inc., at 883 Broadway, Albany 1, N. Y. Executive office 1790 Broadway, New York 19, N. Y. Subscription price $15.00 per year for United States, elsewhere $16.00 to cover postage and handling. Single copies $1.50 postpaid. Second-class postage paid at Albany, N. Y. Published monthly.

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The American Journal of Public Health is indexed in the Industrial Arts Index and, in part, in the Quarterly Cumulative Index Medicus, Biological Abstracts, Chemical Abstracts, Engineering Index, and Public Affairs Information Service.

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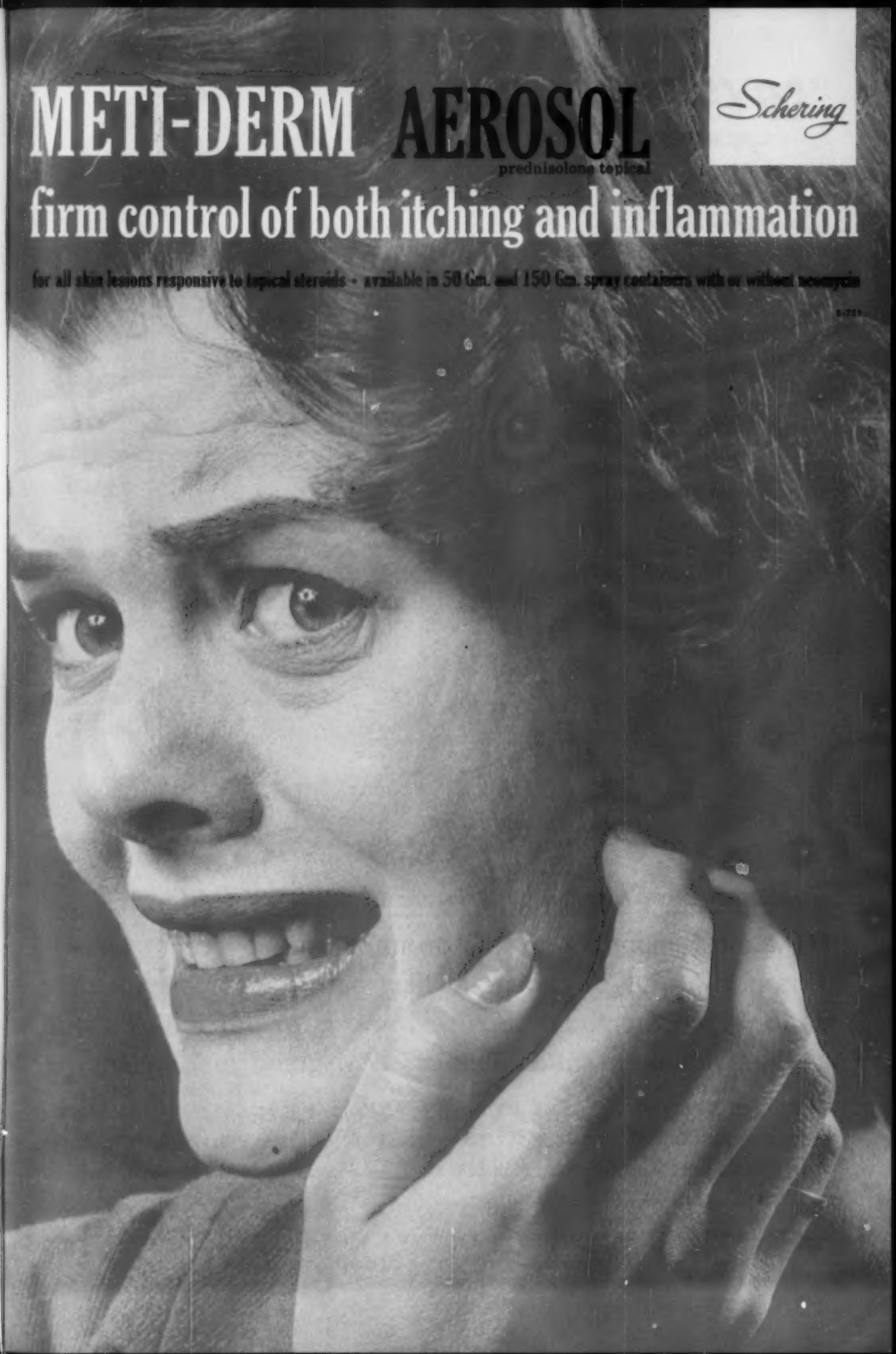
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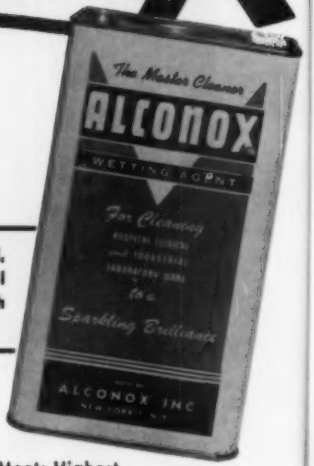

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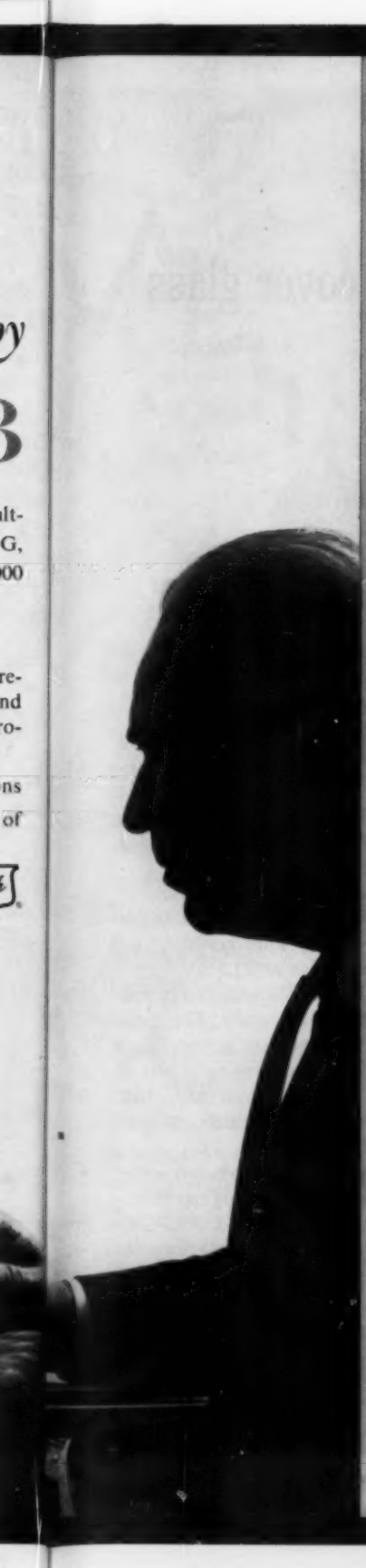

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In cases of gonorrhea in which syphilis is also present, administration of penicillin may prevent the appearance of the chancre and thus mask the first evidence of syphilis. This is not to be falsely construed as benefiting the syphilis. Cases with a suspected primary lesion should have darkfield examinations to verify or exclude syphilis before receiving penicillin, and blood serology should be done monthly for at least 3 months.

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References. 1. Wright, W.W.; Welch, H.; Wilner, J., and Roberts, E.F.: Body fluid concentrations of penicillin following intramuscular injection of single doses of benzathine penicillin G, and/or procaine penicillin G. Antibiotic Med. & Clin. Therapy *6*:232 (April) 1959.

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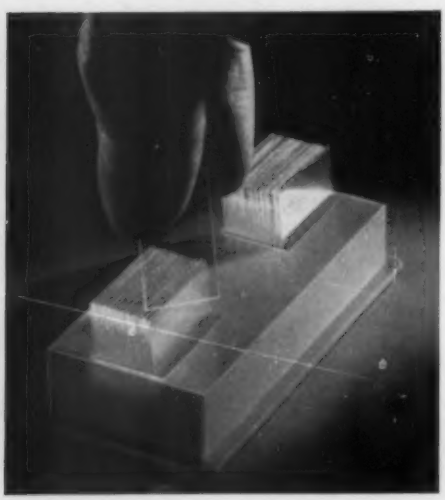

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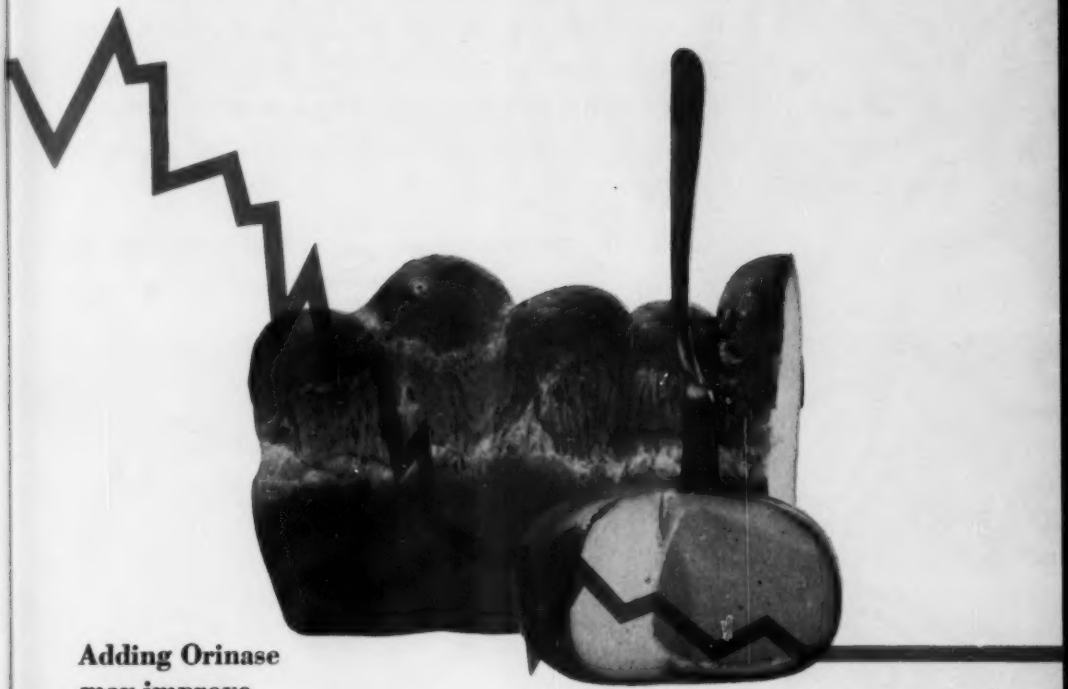

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Cautions: Observe all standard diabetes precautions: dietary restriction, weight control, exercise, hygiene, avoidance of infection, and adherence to dosage. As with exogenous insulin, changes in dosage may be necessary during the course of management. In the event of stress conditions, trauma or infection, increased dosage or supplementary animal insulin may be required.

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References:

1. Bollinger, R. E., *et al.*: J. Kansas M. Soc. *61*:135 (March) 1960. 2. Williams, R. H.: Diabetes, New York, Paul B. Hoeber, Inc., 1960, pp. 491, 492. 3. Bradley, R. F.: Ann. New York Acad. Sc. *82*:513 (Sept 25) 1959. 4. Sherry, S., *et al.*: Ann. New York Acad. Sc. *71*:249 (July 10) 1957.

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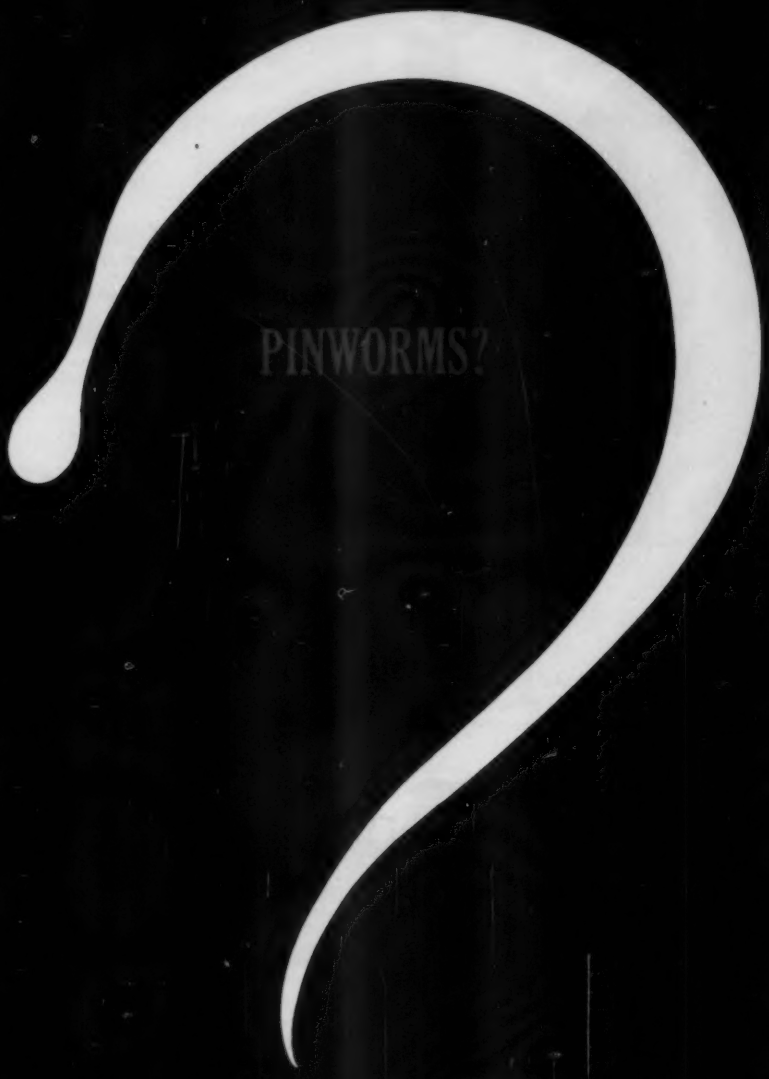

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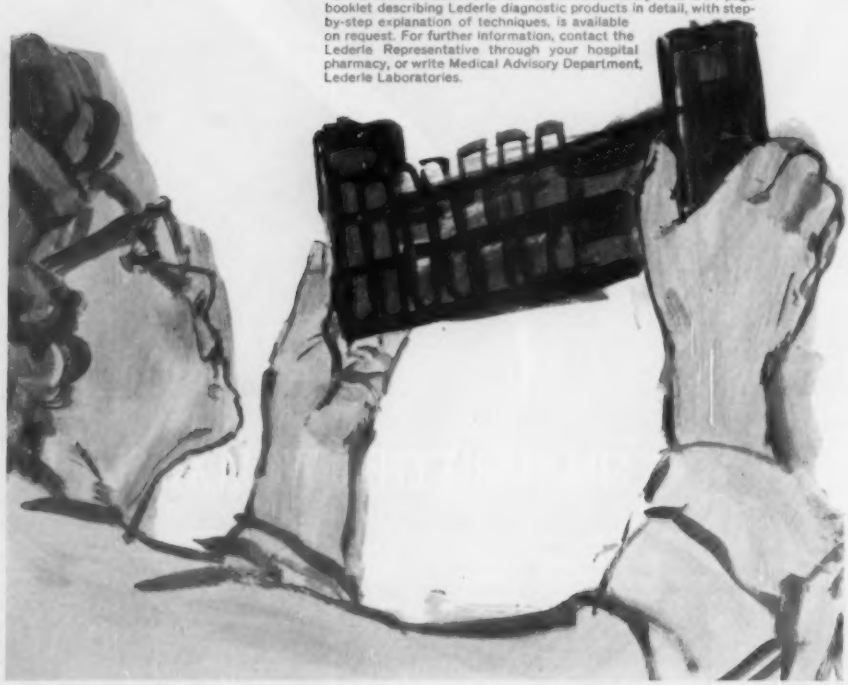

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INDICATIONS: As an adjunct in the treatment of progressive exudative, hematogenous lesions and the pneumonic type of pulmonary tuberculosis; cutaneous tuberculous lesions and fistulas; tuberculous lymphadenitis; tracheobronchial and laryngeal tuberculosis; alimentary, peritoneal, genitourinary, meningeal, miliary, and bone and joint tuberculosis; and postoperatively in thoracic surgery on tuberculous patients. It is useful prophylactically in operations such as lobectomy and pneumonectomy for pulmonary tuberculosis.

ADMINISTRATION AND DOSAGE: VIOCIN should be administered by *deep* intramuscular injection, preferably into the gluteal, thigh, or deltoid muscles. The dosage employed for most forms of tuberculosis is 2 Gm. (given in two doses of 1 Gm. each, 12 hours apart) every third day, usually in combination with PAS (12 Gm. daily by the oral route). Therapy should be continued for at least four to six months. Daily administration of VIOCIN should never exceed 2 Gm. and should never be given continuously for more than one month.

SIDE EFFECTS: The toxicity of VIOCIN is related chiefly to dosage. When recommended dosages are used, toxic reactions are unlikely to occur with any degree of frequency or severity. They may occur in occasional individuals, however, and the following reactions should be watched for in all patients receiving the drug: renal irritation, disturbances of the eighth cranial nerve, allergic reactions and eosinophilia, electrocardiographic abnormalities, edema and fluid retention, and disturbances in the serum electrolyte pattern.

PRECAUTIONS AND CONTRAINDICATIONS: VIOCIN should be used under the close supervision of the physician, and should not be used when routine measures (as in minimal or primary pulmonary tuberculosis) or other drug therapy (streptomycin, isoniazid, PAS, either singly or in combination) would be effective. Like other antituberculous agents, VIOCIN is of relatively little value in the therapy of extensive caseous or fibrotic lesions. Patients with impaired renal function should receive lower dosages and be carefully watched for signs of toxicity. The similar nature of the toxic manifestations of streptomycin and VIOCIN suggests that these two drugs should not be used concomitantly except when the potentialities of other drug combinations have been exhausted. They should not be used on the same day, and the higher dosage ranges should be avoided.

SUPPLIED: In vials containing the equivalent of 1 Gm. or 5 Gm. viomycin as the sulfate. Diluent to be added.

More detailed professional information available on request.

1. Davey, W. N.: GP 19:107, No. 1, 1959.

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A report of nutrition teaching in elementary textbooks

Leading educators believe that nutrition education should start in the early grades. A good three-quarters of both principals and teachers who think their students do not get three balanced meals *say breakfast is most apt to be neglected.** A recent study made by educational consultants found in 34 elementary health textbooks that among other breakfasts, a basic cereal breakfast appeared in the majority of textbooks examined. The majority of textbooks examined included breakfast teaching ideas based on the Iowa Breakfast Studies.** The Iowa Breakfast Study of School Boys demonstrated that students worked better and the majority of them had a definitely better attitude and a better scholastic record when a good breakfast was eaten.

**A Study of the Teaching of Nutrition in the Public Schools Published by Cereal Institute, Inc., January, 1952*

***A Summary of the Iowa Breakfast Studies Published by Cereal Institute, Inc., May, 1957*

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IN BRIEF

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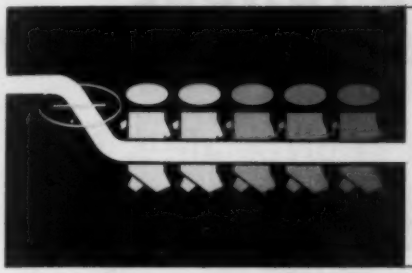
INDICATIONS: Uncomplicated diabetes mellitus of stable, mild or moderately severe nonketotic, maturity-onset type. Certain "brittle" patients may be helped to smoother control with reduced insulin requirements.

ADMINISTRATION AND DOSAGE: Familiarity with criteria for patient selection, continued close medical supervision, and observance by the patient of good dietary and hygienic habits are essential.

Like insulin, DIABINESE dosage must be regulated to individual patient requirements. Average maintenance dosage is 100-500 mg. daily. For most patients the recommended starting dose is 250 mg. given once daily. Geriatric patients should be started on 100-125 mg. daily. A priming dose is not necessary and should not be used; most patients should be maintained on 500 mg. or less daily. Maintenance dosage above 750 mg. should be avoided. Before initiating therapy, consult complete dosage information.

SIDE EFFECTS: In the main, side effects, e.g., hypoglycemia, gastrointestinal intolerance, and neurologic reactions, are related to dosage. They are not encountered frequently on presently recommended low dosage. There have been, however, occasional cases of jaundice and skin eruptions primarily due to drug sensitivity; other side effects which may be idiosyncratic are occasional



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diarrhea (sometimes sanguineous) and hematologic reactions. Since sensitivity reactions usually occur within the first six weeks of therapy, a time when the patient is under very close supervision, they may be readily detected. Should sensitivity reactions be detected, DIABINESE should be discontinued.

PRECAUTIONS AND CONTRAINDICATIONS: If hypoglycemia is encountered, the patient must be observed and treated continuously as necessary, usually 3-5 days, since DIABINESE is not significantly metabolized and is excreted slowly. DIABINESE as the sole agent is not indicated in juvenile diabetes mellitus and unstable or severely "brittle" diabetes mellitus of the adult type. Contraindicated in patients with hepatic dysfunction and in diabetes complicated by ketosis, acidosis, diabetic coma, fever, severe trauma, gangrene, Raynaud's disease, or severe impairment of renal or thyroid function. DIABINESE may prolong the activity of barbiturates. An effect like that of disulfiram has been noted when patients on DIABINESE drink alcoholic beverages.

SUPPLIED: As 100 mg. and 250 mg. scored chlorpropamide tablets.

CAUTION: Federal law prohibits dispensing without prescription.

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MEAT *is a high quality protein*

. . . studies have supported the view that the calorie intake and ratio of carbohydrate to protein in the breakfast meal influence the post-prandial blood glucose curve, with the higher protein intakes being associated with lower peaks and slower return to fasting levels. (1, 2, 3)

While the source of calories is not critical—an intake of 15 or more gm. of protein slows the blood sugar fall and may be associated with a sense of well-being lacking in low protein breakfasts. (4)

1. Tuttle, Wilson, and Daum: J. Appl. Physiol., **1**, 545, 1949
2. Orent-Keiles, and Hallman: Circ. No. 827, 1949, U.S. Dept. Agric., Washington, D.C.
3. Coleman, Tuttle, and Daum: J. Am. Dietetic Assoc., **29**, 239, 1953.
4. Maurice E. Shils—Mod. Nut. in Health & Disease, Ch. 37, 1960

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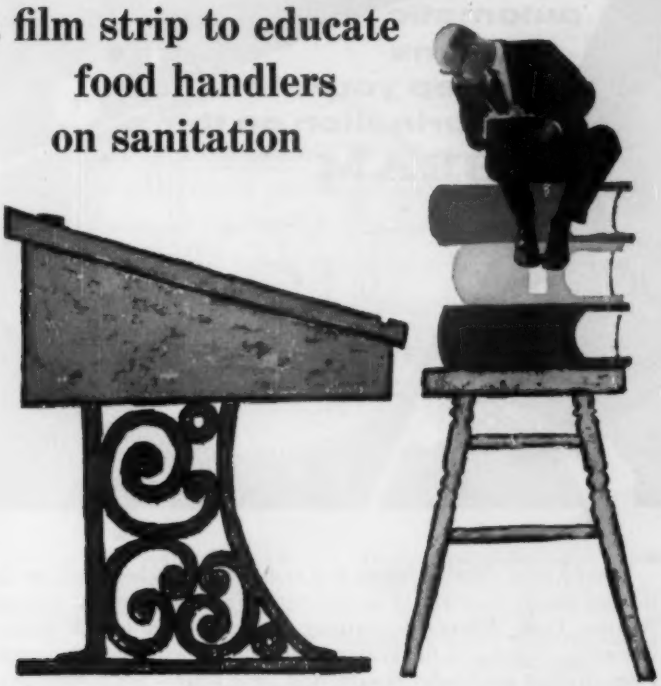

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Journal of Public Health

Public health officials in the community may be called upon for information and guidance on food additives and the problems they raise. This review of the functions of food additives and of the regulatory control of these substances is intended to help such persons.

THE FUNCTION OF FOOD ADDITIVES

John F. Mahoney, Ph.D.

DURING the past 25 years there has been a marked increase in the quantity and variety of food additives used in this country. This trend has been viewed with concern by some who have felt that it could lead to a decrease in the safety, the wholesomeness, and the integrity of our food supply. Others have considered this trend to be gratifying evidence that the American public was starting to receive the benefits of food research and development and that important progress has been made in achieving independence over some of our traditional environmental limitations. It has been generally recognized from both points of view that the provisions of the Federal Food, Drug, and Cosmetic Act of 1938, dealing with food additives, were inadequate to meet present-day needs. This has led to new laws and significant changes in the way in which food additives are now regulated.

To the food technologist, a food additive is a substance, other than a food itself, which is present in food as a result of any aspect of production, processing, storage, or packaging.* It is convenient to divide additives into two classes: "Intentional additives" are those deliberately introduced to accomplish a specific function in the food; "incidental additives" are those which unavoidably become components of food but serve no useful purpose in the finished food.

Both intentional and incidental food additives are introduced into food in a

* The Food Additives Amendment of 1958 provides a legal definition of the term "food additive" which restricts the term by excluding substances regulated by certain other sections of this and related laws and by excluding substances generally recognized as safe. The term "food component" has been suggested for those substances which do not meet the legal definition of food additives. The legal definition also includes animal feed additives as food additives.

reasonably predictable fashion. As such, they lend themselves to a certain type of regulation and control. The accidental or unpredictable introduction of substances to food poses an entirely different type of problem, outside the scope of the present subject. Such substances would be considered to be adulterants.

Intentional food additives may be classified in terms of their function in foods. The most extensive published list of intentional food additives is that compiled by the Food Protection Committee of the National Research Council, entitled "The Use of Chemical Additives in Food Processing." The 1956 edition of this booklet is currently being revised and will probably be expanded considerably. A very useful booklet written in more popular language is entitled "What Consumers Should Know About Food Additives," prepared by the Food and Drug Administration.

An important class of intentional food additives are the nutrients. These include the vitamins, minerals, and amino acids which may be added to foods to compensate for nutrients lost in processing, and to eliminate certain dietary deficiencies. Enriched flour, bread, and other cereal products, iodized salt, vitamin D fortified milk, and vitamin A fortified margarine represent food additive usages which are endorsed by leading nutritionists and are required by the laws of many states. As our knowledge of the nutritional requirements and the deficiency diseases of man increases, we may expect continued attention to be directed toward controlling the composition of our diet through food selection and perhaps through the addition of other nutrients.

The preservation of food has always been important to mankind, and the use of salt, spices, smoking, and pickling represent some of the earliest recorded uses of food additives. Although today, much of the food we purchase is protected from deterioration by some sort of physical treatment such as cooking, pasteurizing, refrigerating, freezing, or dehydration, combined with appropriate packaging, there is a continuing need for intentional food additives to extend use life and prevent spoilage. Antimycotics are used to prevent molding of bread, citrus fruits, and cheese. Antioxidants will delay the onset of rancidity in fats and fatty foods. Vitamin C is used to prevent the enzyme action which darkens certain fruits and vegetables like sliced apples, frozen peaches, and peeled potatoes. Antibiotics are used to slow down bacterial growth and extend the shelf life of refrigerated fish and poultry.

It should be emphasized that the additives which are permitted to be used to prevent food deterioration are, generally speaking, incapable of masking spoilage or of converting decomposed food to an edible state. Preservatives whose use would disguise spoilage, deceive the consumer, or permit unsanitary food-handling practices are prohibited.

Although much progress has been made in reducing food spoilage, our losses in this country still amount to several billion dollars each year. This is a luxury which we cannot afford indefinitely and is a major challenge to the food technologist.

Other classes of additives of particular importance to the food processor are the emulsifiers, thickening agents, sequestering agents, maturing agents, surface active agents, acids, alkalies, and buffers. The use of certain of these products enables the processor to modify in some degree the physical properties of foods. More important, they permit him to compensate for the natural variations in his raw materials, enabling him to produce processed foods which are consistent in appearance and which do not separate, harden, thicken, or otherwise change in physical properties during storage. Such control is particularly important to the successful development of many convenience foods.

Food colors, flavors, spices, and sweeteners are other types of intentional food additives whose uses in home cooking as well as in commercial food processing are well known. In terms of number, flavor additives probably exceed all other intentional food additives combined, although in terms of quantity, their use in foods is small. Artificial food flavors are usually mixtures of many compounds, carefully selected and blended.

Incidental additives are more difficult to classify because they include all additives except those added intentionally. The two major sources of incidental additives are residues from the pesticides used on crops and substances which migrate to the food from its package.

Since incidental additives perform no function in foods, it is desirable that their presence in foods be kept at an unavoidable minimum. It should be recognized, however, that the proper use of pesticides is absolutely essential to the production of an adequate and wholesome food supply and that we depend primarily upon the food package to insure that our foods reach the consumer in wholesome condition. Although incidental food additives may serve no useful function in foods, they are of vital importance to our over-all food economy.

Regulatory control over the use of food additives is based primarily on the Federal Food, Drug, and Cosmetic Act of 1938, together with the Pesticide Chemicals Amendment of 1954, the Food Additives Amendment of 1958, and the Color Additives Amendment of 1960. Of these laws, the Food Additives Amendment is of particular importance with respect to intentional food additives except for colors and for incidental food additives excluding pesticides.

This amendment provides: First, a legal definition of the term "food additive." This definition is somewhat different from that used by food technologists in that it includes only those substances to which the amendment is intended to apply. Thus it excludes additives covered by certain other sections of the law such as pesticides and colors, it excludes additives previously approved for use, and it excludes additives generally recognized as safe. It should be noted that it includes additives for animal food as well as for human food; the animal need not necessarily be of an edible variety.

Second, the amendment prohibits the use of any food additive not having governmental approval. Approval involves favorable action based on information supplied in a food additive petition which would ordinarily be prepared and submitted by the additive manufacturer. Detailed directions are provided concerning the information to be submitted. This includes disclosure of the additive, its intended effect in food, the quantity required to accomplish this effect, evidence that the additive will be safe as used, and an analytical method by which the additive can be detected in food.

Two points deserve special comment here. In judging whether an additive is safe, FDA is specifically instructed to take into account the quantity and manner in which the additive is used. Also, the usefulness or desirability of an additive is not a matter for regulatory concern, although the additive must be shown to be effective in the quantities proposed for use and must not lead to consumer deception.

Notice that a petition has been filed is published in the Federal Register. Approval of the petition is also published in the Federal Register in the form of a food additive order. The order may restrict usage in many ways, such as purity of additive, foods with which it may be used, maximum quantity permitted, and reason for use. It should be noted that in so far as the Food Additives Amendment is concerned, approval to use an additive is granted to everyone and not just to the company that submitted the petition. This is distinctly different from

the way a New Drug Application is handled, where approval is restricted to the petitioner.

The Food Additives Amendment indicates the procedure to be followed when the additive in question falls under more than one section of the law. It also makes provision for review by the courts in the event that the food additive petition is not approved and the petitioner wishes to appeal the matter further.

The Food Additive Amendment was signed into law in September, 1958, after a ten-year effort on the part of both government and industry to modernize our food additive laws. Since its enactment, many problems have arisen, some of which were not foreseen at the time that the law was being written. Some of these problems relate to the newness of the law and the fact that it represents a major change in the manner in which food additives are to be controlled. There have been delays in developing regulations and policies by government; there have been equally serious delays in appreciating the provisions of the amendment by the food additive manufacturer and in initiating suitable action.

It should be recognized that the Food Additive Amendment applies to all substances meeting the legal definition of food additive and not just to new additives. The provision affecting additives in use before 1958 became effective in March, 1960, although in most cases, a one-year extension of the effective date has been granted. This means that by March, 1961,* the legal status of hundreds of different substances will have to be resolved. A substance in this category will have to be approved by the food additive petition procedure, exempted from the requirements of the Food Additive Amendment by decision that it is legally not a food additive, or else dropped as an item of commerce.

At this writing, it hardly seems possible to avoid a chaotic situation unless most of the substances in question are exempted by concluding that they are not legally food additives because they are generally recognized as safe by qualified experts. Unfortunately, this concept is a new one, and there is little precedent to serve as a useful guide in determining what is required for GRAS† status. Industry spokesmen have repeatedly urged that the law be amended to postpone the March, 1961, deadline, where there is no danger to public health, in order that this problem of existing food additives can be considered in more deliberate fashion.

Other problems arising from the enactment of the Food Additive Amendment seem to be due to the difficulty in translating some of our scientific judgments into legal language which is subject to the interpretation of the administrator and the courts without reference to the background of its development. The Delaney Clause typifies this type of problem. This is the provision that prohibits use in food of any substance found to induce cancer when ingested by man or animal. The objective of this clause is praiseworthy; no one wants to permit additives in our foods which will cause cancer. The way in which this objective is phrased is unfortunate, in that it can be construed to prohibit the use of certain substances which do not provide a hazard to human health. The effect of the Delaney Clause has already been noted in the curtailment of certain research programs on animal feed additives.

Unfortunately, the emotional and political aspects to this problem which have arisen during the past year make it unlikely that any modification can receive dispassionate consideration for the present. It should be noted that the Congress saw fit to include the Delaney Clause

* On April 7, 1961, Public Law 87-19 was enacted which provides for extensions up to June 30, 1964, where necessary to resolve the status of certain existing food additives.

† GRAS = generally recognized as safe.

again in the recently enacted Color Additives Amendment, although President Eisenhower's Science Advisory Committee reported generally unfavorably on the need for this type of restriction.

Another problem of this type lies in the legal definition of zero, a subject appropriately called "Much Ado About Nothing." A food package component, for example, may become a food additive if it migrates to a food in any detectable quantity, regardless of how minute or unimportant that quantity may be. This means that the legal status of such a material may be determined and may be changed simply by the sensitivity of the method of analysis. The law does not recognize zero as a limit but as an absolute value. Attempts to define an acceptable practical equivalent of zero have thus far been unsuccessful.

Perhaps the most serious question facing us at the present time is whether the Food Additives Amendment in its present form will be found to be a real overall benefit to the American public in view of its long-range effect upon food additive research and development. It should be recognized that in America we have for years enjoyed the world's best and most wholesome food supply, that food additives have made important contributions to availability, low cost, and high quality of these foods, and that our record in terms of the safe and proper use of these food additives has been outstandingly good. The Food Additives Amendment must be considered primarily as a preventive, rather than a curative measure. Its purpose was to permit full advantage to be taken of food additives by permitting their use at safe levels in food while at the same time regulatory control was strengthened by requiring approval prior to use and by shifting the basis for prohibiting an additive from poisonous or deleterious to inadequate evidence of safety.

There has been some concern expressed that a very strict interpretation of the law will mean that in developing a food additive much money and effort will be devoted to obtaining information not needed to protect the public, and that it will be impractical to develop new additives for small markets. Curtailment of research on animal feed additives has already been attributed to the Delaney Clause. The publication of a summary of the food additive petition as long as five months before the order is issued, and the policy of approval for use of the additive by anyone rather than just by the petitioner, tend to eliminate competitive incentive. Finally, the small proportion of food additive petitions which have been approved may discourage those who must justify their research efforts in terms of probable return.

It is probably too early as yet to assess quantitatively the effect of the Food Additives Amendment upon the development of new food additives. This matter should be carefully followed, particularly during the next few years, to make sure that the public is receiving an optimal return under the law both in terms of protecting the safety of our food supply and in receiving the technological benefits of food additive research.

These are some of the food additive problems which are before us today. They are complex and controversial problems, with both scientific and legal facets, for which there are not likely to be simple solutions. It is little wonder that they are often poorly and incompletely understood by those who have only an infrequent contact with food additive developments.

The importance of a better understanding by the general public of some of these food additives problems should not be underestimated. The degree of interest is clearly shown by the extent to which women's clubs, labor unions, civic organizations, and consumer groups have participated in public hearings on food additive legislation. The power of the public has been dramatically illustrated

by the change in sales of a food whose quality has been questioned.

The public is looking to the public health officials and scientists in each community for information and guidance on these matters. Each of us has a responsibility to become more familiar with food additive problems in order that we may be prepared to fulfill this obligation intelligently.

Dr. Mahoney is manager, Technical Service, Merck and Company, Inc., Rahway, N. J.

This paper was presented before the Food and Nutrition Section of the American Public Health Association at the Eighty-Eighth Annual Meeting in San Francisco, Calif., October 31, 1960.

Film Helps Girl Save Life

"It was a neighborhood ball game in Oceanside. Thirteen-year-old Donna Young swung the bat. A line drive slammed into the chest of 7-year-old Kim Brown. Kim crumpled to the ground. Her face and finger nails turned blue. She had stopped breathing. There was little time to lose.

"Donna rushed forward. She rolled Kim gently onto her back, tipped Kim's head back and began breathing air from her own lungs into Kim's. After a few minutes of mouth-to-mouth resuscitation Kim began breathing again.

"Only a day ago Donna would have stood helpless and frightened. But on this day she had seen a film on rescue breathing. The public health nurse assigned to her school had shown Donna's class 'That They May Live.' The film demonstrates mouth-to-mouth resuscitation in detail. After the film, the nurse gave a classroom demonstration. As Donna watched, she doubted if she would ever have the chance to save a life."

(From "San Diego's Health," June, 1961; bulletin of the San Diego (Calif.) Health Department. For further information on the movie see A.J.P.H. (Aug.), 1960, p. 1243.)

A longitudinal study of healthy children with similar cultural and socioeconomic backgrounds was made to study nutrient intakes. A wide range of intake was found and the author presents the findings in her report.

DIETARY INTAKE OF INDIVIDUALS FOLLOWED THROUGH INFANCY AND CHILDHOOD

Virginia A. Beal, M.P.H., F.A.P.H.A.

A REAL understanding of the variations in food intake of an individual as time progresses and of the relationship of the level of each nutrient in the diet to the physical and physiological status of that individual can best be approached by longitudinal studies. There is much uncertainty about the nutritional requirements of infants and children. At the moment, the greatest disagreement concerns protein requirements during the first year of life,[1,2] but many other questions might be raised about the recommended allowances during infancy and childhood. To a large extent the allowances we now accept have been empirically adapted from the requirements for adults, for which there is better evidence.

There are many reasons for our uncertainty about the nutritional needs of children. With animals, one may experiment with minimal or deficient intakes of selected nutrients over long periods of time under varying conditions so that the borders of adequacy of intake may be clearly established. With adult volunteers there is somewhat more restriction of latitude in experimentation, but the ranges of nutrients fed have been wide enough to permit reasonably precise determination of requirements. The ethical questions raised by this sort of experimentation with infants and children have logically deterred a clear delineation of requirements in this younger group. Our information is meager, not only in regard to the needs for varying levels of growth, but also in respect to the rate of growth which may be considered optimal. We know very little about the adaptation of individuals to different levels of intake. There have been many cross-sectional and short-term metabolic studies of children, but for the most part we have had to depend on clinical observations of children on known intakes supplemented with evaluations of physical status, growth rate, and blood and excretion levels. Although one may evaluate the child and his intake at any single stage of his development, unless one has a detailed understanding of his personal history—some knowledge of how he reached this stage—this evaluation may be misleading. There are marked variations among different children at any single age and within one child from one age to another in the rate of growth, in physical and physiological functioning, and in psychological and emotional development, as well as in intake of foods and the nutrients which they supply. Long-term studies promise to provide a more complete understand-

ing of the significance of dietary intake to growth and development during childhood and to the health of the adults these children will become.

The Child Research Council has been studying the growth and development of a group of children in the Denver area for more than 30 years. At the present time 38 second-generation children are included in the study. For the past 14 years evaluation of nutritional intake has been a part of this program. Nutrition histories[3] are taken at monthly intervals during the first year of life and thereafter at intervals of three months. No effort is made to alter the food intake of either the children or their families, but a detailed history is obtained of the food which has been consumed in each interval of time, supplemented with four records of 24-hour intakes. Our families are in the upper middle class in socioeconomic status, have voluntarily enrolled in the study, and are remarkably cooperative. These three factors are important in providing greater validity to this type of study. The parents realize the significance of their contribution to a better understanding of children and therefore accept the need for accurate information. It is not unusual for a mother to suggest improvements in our technic so that we may obtain more complete data.

The major aim of these nutrition studies is to investigate the effects of differing levels of dietary intake on the physical and physiological findings in these children. Since they are examined at regular intervals comparable to the timing of the nutrition histories, correlations are possible between dietary intake and the rate of growth, the basal metabolic rate, dental caries, the blood levels of proteins, cells, hemoglobin, lipids, and vitamins, and various other measurements. Thus far we have concentrated primarily on the delineation of the patterns of intake of 13 nutrients as they vary characteristically for each individual child and as they change for the group as a whole progressing through the age levels from birth. Since we have found that in many respects the intakes of these children are different from the levels of intake recommended by the National Research Council, it has been necessary first to establish the range and percentiles of intake of each nutrient as observed in this group. This paper presents the intake of some selected nutrients from birth to eight years of age, and will indicate differences between sexes as well as variations which have been observed between individuals and between siblings. Since the majority of the children on whom nutrition studies are being done have not yet reached adolescence, no data beyond eight years will be given.

For any single nutrient a wide range of intake at any given age may be observed. Even though this group is relatively homogeneous in racial background and socioeconomic status, the spread from minimum to maximum intakes is wide. For calories, carbohydrate, fat and protein, the maximum observed at any age may be from two to three times as great as the minimum intake. During the preschool period one child may consume four times as much calcium as another. The range is even wider in vitamin intake, with the maximum:minimum ratio for ascorbic acid as high as 10:1, and for carotene (plant sources of vitamin A) 20:1. It is apparent that healthy children even within a single culture show a wide range of intake.

The distributions of intake for age tend to be skewed to the right, with a greater degree of skewness for boys than for girls. For example, the 90th percentile of calorie intake for boys is approximately 50 per cent further from the median than is the 10th percentile, and the range from median to maximum intake is approximately twice the range from median to minimum. The degree of skewness observed in vitamin intake

is even more pronounced. Although the intakes of girls tend to approach more nearly a normal distribution, they also show a moderate degree of skewness. In other words, healthy children who are growing at rates within an acceptable range vary widely in the amount of food they consume, and the tendency toward very high intakes is greater than the tendency toward very low intakes.

Changes of intake with age show a pronounced group pattern. During the first six months of life intake of all nutrients rises smoothly. In late infancy and the early preschool period there are decreases in the consumption of a few specific foods and therefore in the curves of intake of the nutrients for which these foods are major sources. There is a decrease in the intake of calcium, phosphorus, iron, vitamin A, and riboflavin while other nutrients either remain relatively constant or increase slightly. During the early school years there is a slow but steady rise in all nutrients until the beginning of the adolescent period. These curves of intake are similar to the curves of growth in height and weight, in which the rapidly ascending curve of infancy is followed by irregularity in the preschool period and then by a relatively smooth increase in the early school years.

Sex differences in total intake are seen almost from birth, although the differences in the first six months are slight. For some nutrients, such as calcium, there is a marked difference between boys and girls from six months of age, while for others the differences are small until after 18 months. Figure 1 shows the median calorie intakes of boys and girls to eight years of age expressed in three ways. The intake of total calories is higher in boys than in girls from the second month of life, but the difference becomes marked only after 18 months with boys maintaining an intake consistently higher than girls. With the use of body weight as a standard of reference, calorie intake per kilogram for both sexes drops after the second month. From six months to two years the intake of boys remains fairly constant, then drops slowly and steadily throughout this span to eight years. In contrast, intake of calories per kilogram of body weight by girls continues to decrease from two months to eight months, rises slightly for the next year, then drops more rapidly than does the boys' intake. We have recently become interested in the use of height in the expression of calorie intake. After a marked rise in the first 21 months for both sexes, the median curves of calorie intake per centimeter of height for boys and girls separate. The levels become stabilized from two years to seven or eight years, with boys maintaining a median level of 15.3 calories per centimeter while the girls vary only slightly around a level of 13.5 calories per centi-

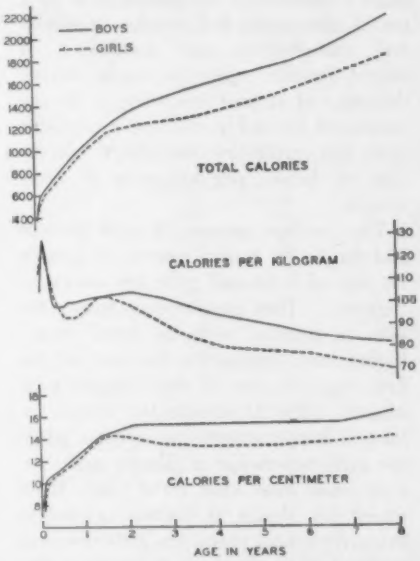

Figure 1—Median Intakes of Boys and Girls of Total Calories, Calories per Kilogram of Body Weight, and Calories per Centimeter of Height

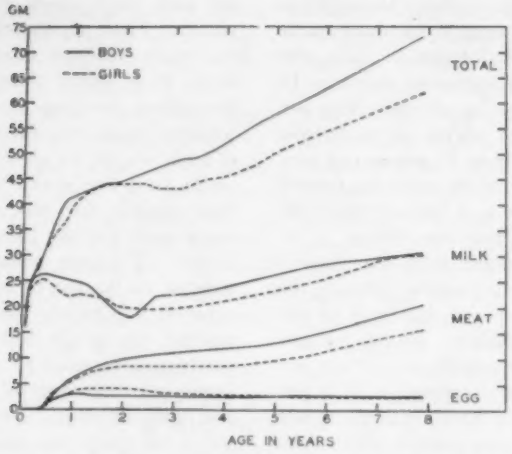

Figure 2—Median Intakes of Boys and Girls of Total Protein and Protein From Milk, Meat, and Eggs

meter. Aside from its simplicity as a point of reference, this promises to be a useful description of intake. Calories and carbohydrate per centimeter of height remain relatively stable during this span of at least five years, while the intakes of fat and protein per centimeter show less variability than either total intake or intake per kilogram of body weight.

The median intakes of total protein and the major animal sources of protein for age of boys and girls are shown in Figure 2. Total protein rises during the first 18 months, with the boys' intake higher only during the last half of the first year because of their higher milk intake. After 18 months the protein intake of boys continues to increase while the girls experience a plateau and then a decrease until after three years. Even when this intake is increasing during the early school years, the girls continue to lag behind the boys throughout this period to eight years. The differences between the sexes in intake of specific foods become readily apparent. The decrease in milk consumption for both sexes begins at approximately six months, but boys maintain a higher intake to 18 months, with an abrupt decrease during the next year, followed by a rapid recovery. Girls never reach as high a level nor as low a level as the boys, on the average, but their decrease in milk consumption is spread out over a longer period of time and it is not until seven to eight years that the median for girls approximates that for boys. Meat intake for boys and girls is alike during the first year but thereafter boys maintain a higher level than girls, with the dissimilarity accentuated by a plateau in the girls' intake of meat between two and four years. Egg intakes are alike for boys and girls except between one and three years when girls consume more eggs than boys.

As might be expected from the curves of the intakes of milk protein, the calcium intakes of the two sexes are markedly different after six months of age (Figure 3). From three to eight years the 90th percentile of intake for girls

is close to the 75th percentile for boys, while the 25th percentile for girls approximates the 10th percentile for boys. Of more than 60 children followed to date through the preschool period with nutrition studies, only three have not had a marked decrease in milk consumption. There are individual variations in both the timing and the degree of the decrease, but it is a rare child who maintains a high level of intake. Between two and three years of age the median intake of milk is close to 16 ounces daily, with a range from three to 32 ounces.

The preschool period is a time of relatively slow physical growth, with smaller increases in stature and in weight than at any other time during childhood. Therefore, there is smaller requirement of nutrients for growth. In addition, there is a strong suggestion in our data of a relationship between the decrease in milk consumption and the timing of certain psychological and emotional changes in the child's development. Many mothers have commented that the decrease in milk came at a time when the child was showing independence from his mother in other areas of behavior, or at the time toilet training was being carried out, or concomitant with other evidences of emotional turmoil. The progressively earlier attempts to introduce solid foods into the diets of these infants[4] have not been associated with changes in milk intake. That is, for the children of 1960, to whom solids are offered early, the average milk intake is similar to that of the children born in 1946, when solid foods were introduced at a later age. In only a small number of children is the decrease in milk consumption associated with weaning from the bottle. Instead the decrease, which begins usually in the last half of the first year, is often the impetus for the replacement of the bottle by a cup. Thus the trigger mechanisms for this decrease in milk seem to vary from one child to another, and the start of the decrease may occur at any age between six months and two years, but the observation of a

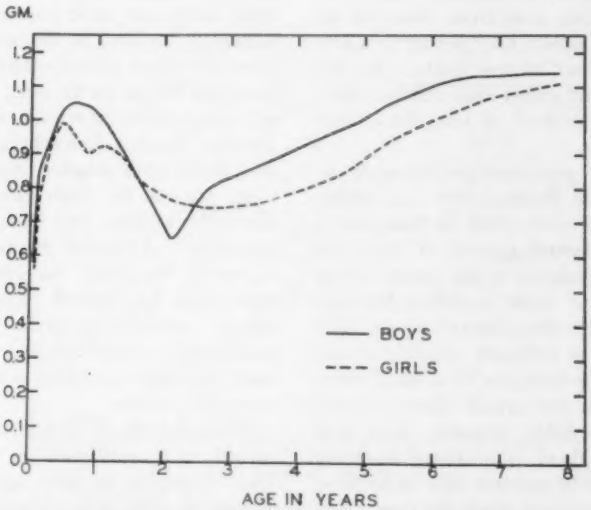

Figure 3—Median Calcium Intakes of Boys and Girls

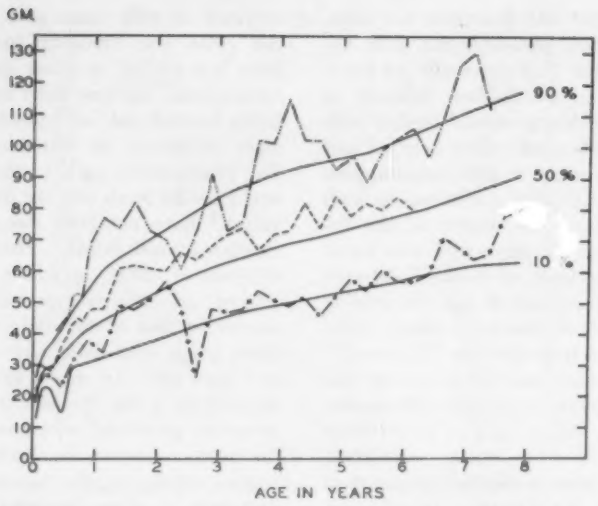

Figure 4—Fat Intakes of Three Boys Plotted Against the 10th, 50th, and 90th Percentiles of the Group

drop in milk consumption has been almost invariable in this group of children. While some children experience an abrupt but short-lived lowering of milk intake, others may persist in a low intake for four to five years. By the time they start school most children have regained a level of at least 24 ounces of milk daily.

After the preschool period with its unevenness of intake, there is a strong tendency for each child to maintain a relatively constant pattern of intake of nutrients in relation to the group. That is, each child tends to follow his own channel within the observed range. Except for those nutrients which are supplied in large amounts by a small number of foods and which show seasonal variation, notably ascorbic acid and vitamin A, there is a strong tendency for a relatively constant rate of increase in intake between three or four years and eight years of age. Figures 4 and 5 show the stability of intake of fat of boys and of girls. In Figure 4 the intakes of three boys are plotted against the 10th, 50th and 90th percentiles of fat intake of the boys in this study. While there are some variations in each curve from one history to the next, the position of a single child in relation to the group pattern remains remarkably constant. The three boys selected maintain positions around the 90th percentile, just above the median, and close to the 10th percentile. A similar picture is seen in Figure 5, in which the fat intakes of three girls are plotted against the percentile curves for girls. After the variability seen in the first three years, each girl tends to follow a constant pattern of fat intake.

Marked shifts of intake have been observed in a small number of children. Two examples of this are shown in Figure 6. The girl whose fat intake is indicated by the broken line tended to

have a high intake during the first five years. The effect of illness is shown in the early part of the second year when the constancy of her curve was broken because her diet was restricted for more than three months in the treatment of a recurrent diarrhea. When she was about five years of age, her father suffered a mild coronary attack and the family eating pattern was adjusted to his low-fat diet; at the same time dietary control was started for this child because of excessive weight gain. As a result her fat intake dropped from the 90th percentile to a new position close to the 10th percentile. The other child, indicated by a dotted line on this graph, had a marked drop in all nutrients including fat between three and four years of age, for which we have no adequate explanation except a decrease in appetite, which was first reported several months before the decrease in food consumption became evident. Her decrease is exaggerated by the fact that her fat intake was at the maximum of the group at three years and at the minimum nine months later, a much wider swing than any other child has shown. Since four years of age she has maintained a lower level of intake and has continued to have a poor appetite. Our records show other examples of irregularity in nutrient intake but they are not common. Most children show a characteristic pattern of intake for each nutrient and remain within their own channels with remarkable constancy.

Because of the problems of time, expense, and personnel in obtaining adequate data on the food intake of individuals, many studies have used the food consumption of population groups to calculate average individual intake. While such figures have some limited use, great caution should be exercised in their application to individuals. For example, such mass statistics have been used in the correlation of the incidence of coronary disease to the fat intake of populations; the conclusions obtained from these mathematical manipulations

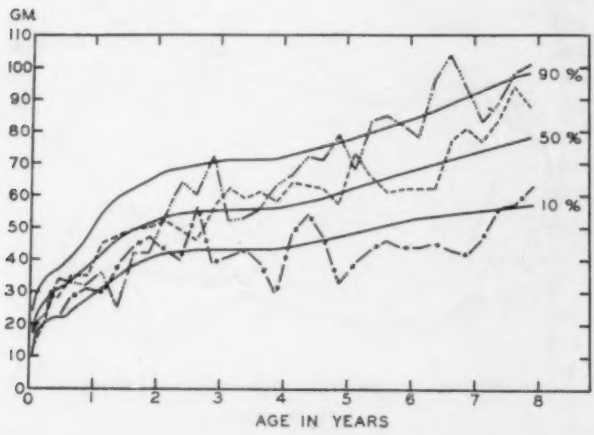

Figure 5—Fat Intakes of Three Girls Plotted Against the 10th, 50th, and 90th Percentiles of the Group

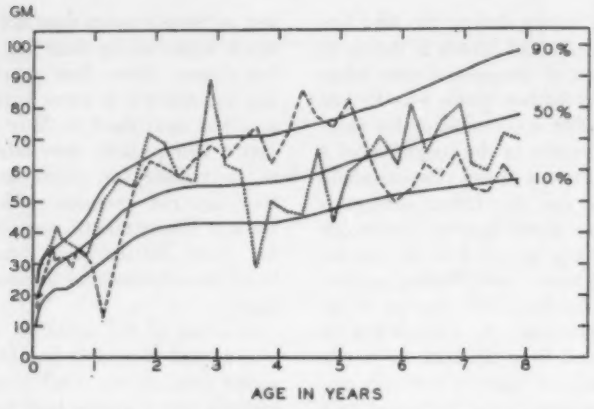

Figure 6—Fat Intakes of Two Girls Plotted Against the 10th, 50th, and 90th Percentiles of the Group

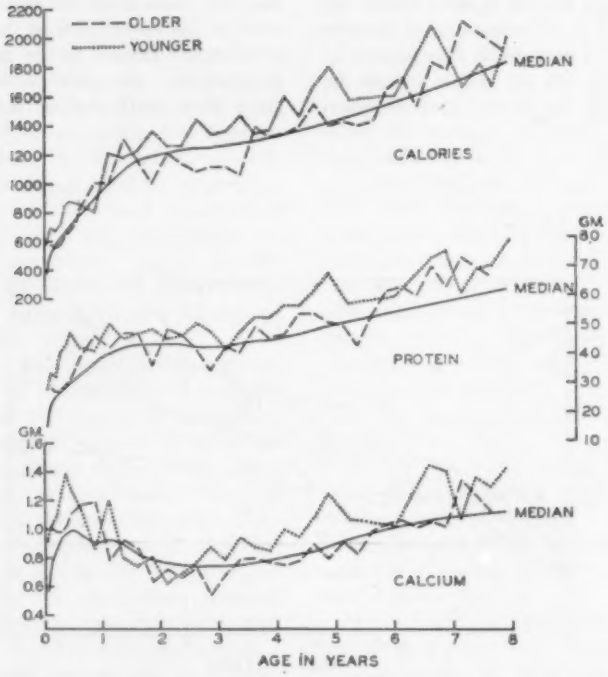

Figure 7—Intakes of Calories, Protein and Calcium of Two Sisters Plotted Against the Medians for Girls

have been used to validate or invalidate various theories of fat intake as a causative factor in heart disease. If such validation is to be accurate, the history of fat intake of individuals within the population group should be obtained, since even in a relatively small sample there may be wide variations in intake and the average has little meaning when applied to the individual case. Our group of children is relatively small and homogeneous, but within this series, as we have already indicated, there has been observed 100 per cent variation in the intake of calories, carbohydrate, fat and protein at any age, and even larger variation in the range of intake of some other nutrients. While the average intake of the group supplies valuable information, any true correlation of the effect of dietary intake on the physical and physiological status or health record of an individual necessitates use of the estimation of intake by that specific individual.

Furthermore, it is often assumed that within a single family group the individual members will have similar intakes. This assumption may be made only with great caution. Figure 7 shows the intake of calories, protein and calcium of two sisters, plotted against the medians for the girls in this series. Although the younger girl's intake is slightly higher than the older girl's at comparable ages, for all practical purposes their intakes are similar.

In contrast, Figure 8 shows the intake of calories, protein and calcium of two brothers plotted against the medians for

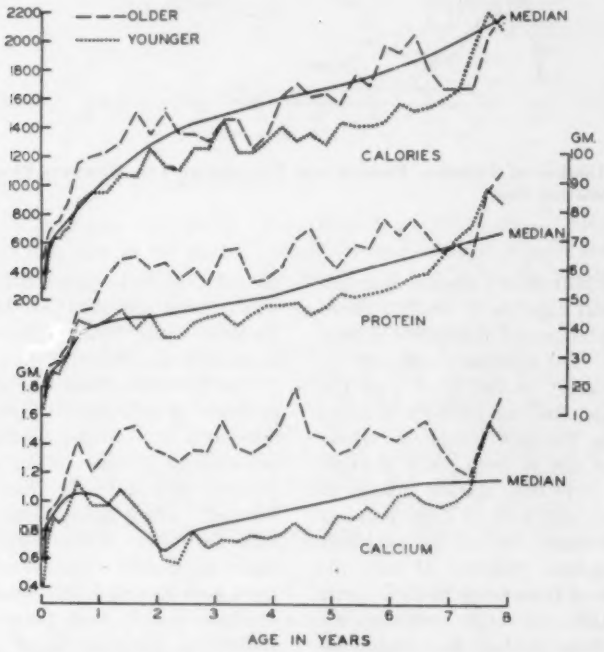

Figure 8—Intakes of Calories, Protein and Calcium of Two Brothers Plotted Against the Medians for Boys

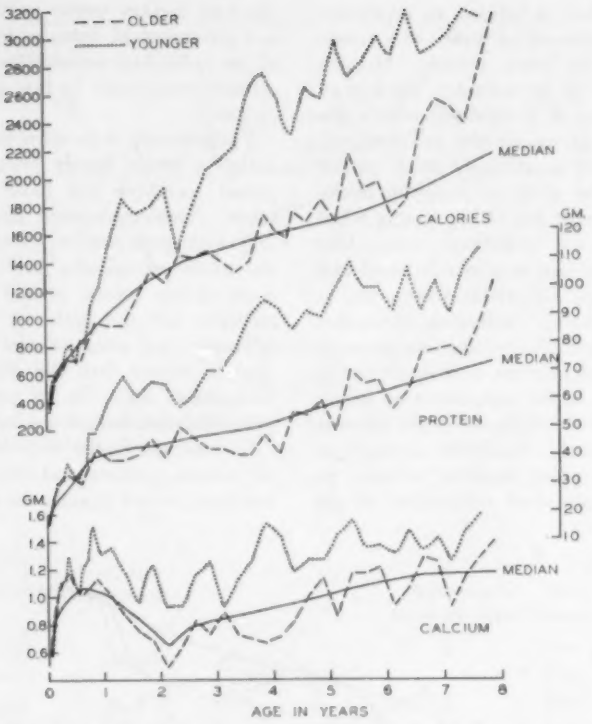

Figure 9—Intakes of Calories, Protein and Calcium of Two Brothers Plotted Against the Medians for Boys

boys. The difference between their intakes of total calories is small. There is a more pronounced difference in protein intake. The contrast in calcium intake is striking; in the third year the older brother's calcium intake is twice as high as his younger brother's. However, by the age of from seven to eight years both boys have similar intakes of these three nutrients. This pair of siblings illustrates one of the problems of cross-sectional studies. If only the information at from seven to eight years were available, one might justifiably assume that these brothers had similar intakes. However, the routes by which they reached that similarity were not at all alike, and the correlation of dietary intake with physical or physiological findings would have to take their past histories into account.

The brothers shown in Figure 9 have presented totally different patterns of intake, with the younger brother having a consistently greater intake of calories, protein and calcium than his older brother. These three pairs of siblings, with the variety of contrasts they depict, make it obvious that even in a single household in which the same foods are available to all, each person makes an individual selection from among the foods available. While there are similarities in the types of food consumed,

individual variations in intake cannot be ignored and average intakes cannot be applied to individuals.

In summary, a wide range of intake of nutrients has been observed in a longitudinal study of healthy children with similar cultural and socioeconomic backgrounds. A smooth curve of increase in intake is evident in the first six months and between four and eight years of age, but there are irregularities in intake during late infancy and the early preschool years. Sex differences in intake are apparent from birth and become more pronounced after the first six months. Each child tends to maintain a characteristic level of intake, and individual variation is evident even within a family group.

ACKNOWLEDGMENT—The author gratefully acknowledges the assistance of Miss Kee K. DeBoer, staff statistician, Child Research Council, in the preparation of these data.

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This paper was presented before the Food and Nutrition Section of the American Public Health Association at the Eighty-Eighth Annual Meeting in San Francisco, Calif., November 1, 1960.

This study was aided in part by a grant from the Nutrition Foundation.

Health Guidance in Preadolescence

"There is a greater interest in adolescence than ever before. In fact some people believe that just as the period of infancy and early childhood formerly received a concentration of attention in pediatrics and public health, so we are now moving toward the adolescent and devoting more time to his problems of growing up and seeking independence in our ever more complex society. In adolescence psychologic problems take on greater significance. As teen-agers are apt to look elsewhere than to their own parents for guidance, the schools through counselors and others often have an opportunity to be helpful to them. Many parents are unprepared to cope with the various phases of adolescent development. For many years health workers have emphasized anticipatory guidance for parents of preschool children, but only recently has it been suggested that similar guidance might be offered to parents of pre-adolescent children. . . . Problems of adolescence may well be the major challenge of our generation, just as infant mortality was for the previous one."

(A. J. Lesser, M.D. Changing Emphases in School Health Programs. Children (Jan.-Feb., 1958.)

Data presented in this report indicate that the activated sludge process effectively removes at least two enteric viruses from sewage, and probably removes more agents.

REMOVAL OF ENTERIC VIRUSES FROM SEWAGE BY ACTIVATED SLUDGE TREATMENT

Norman A. Clarke, Ph.D.; Robert E. Stevenson, Ph.D.; Shih Lu Chang, M.D., Dr.P.H., F.A.P.H.A.; and Paul W. Kabler, M.D., Ph.D., F.A.P.H.A.

QUALITATIVE recovery from urban sewage of a variety of human enteric viruses has been reported by several investigators.[1-3] However, the effectiveness of sewage treatment processes on removal of these viruses has had little study, although the effectiveness of conventional water treatment processes in removing or destroying these agents has received some attention.[3]

Gilcreas and Kelly[4] reported that the level of Coxsackie A virus was reduced about 60 per cent in sewage treated by the trickling filter processes. In a subsequent publication, Kelly, et al.,[5] reported that sedimentation in an Imhoff tank having a two-hour retention time had no destructive action on virus and that secondary treatment on a trickling filter, followed by sedimentation and chlorination, was not always effective in destroying virus in sewage. Mack, et al.,[6] noted a higher per cent recovery of virus from settled activated sludge than from the liquid phase of sewage, indicating perhaps that activated sludge may be effective in removing virus from sewage.

Carlson, et al.,[7] have reported data on the efficacy of activated sludge in removing poliovirus from mixed activated sludge liquor. Their experiments were of the batch type; virus in the form of a suspension of infected mouse cords and brains was added to mixed activated sludge liquor in a ratio of one part virus to 300 parts of sludge and the mixtures aerated zero, six, and nine hours. Using sludge concentrations of 1,100, 2,200, and 3,300 ppm, their data indicate that activated sludge in amounts as low as 1,100 ppm, with six hours aeration, did remove or inactivate the virus to a point where infectivity for mice was greatly reduced.

The investigations of Carlson, et al., were carried out long before accurate quantitative methods for virus assay were developed, and although their data indicate that activated sludge does remove or inactivate poliovirus, the per cent removal, the effect of continually feeding large quantities of virus to sludge, and many other questions remain unanswered. Accordingly, a study was initiated to determine the quantitative aspects of the reaction between activated sludge and certain enteric viruses as carried out by both batch type and continuous feed experiments.

Methods

Viruses—Two enteric viruses were used in these studies, a strain of Coxsackie A9 virus and a strain of Type I poliovirus. The Coxsackie virus, designated CME 456, was isolated in a monkey kidney cell culture from a rectal

swab specimen obtained from a "normal" child. The virus was received in this laboratory as monkey kidney cell passage 1. A large quantity of monkey kidney passage 2 virus was prepared in cell cultures and was used in all experiments. The poliovirus was obtained from Dr. Albert Sabin. It was designated Type I poliovirus (Mahoney) monkey kidney cell passage 37. A large pool of this virus was prepared (monkey kidney passage 38) and used in all experiments.

Activated Sludge Unit—The bench model activated sludge unit has recently been described in detail elsewhere.[8] The unit was operated in most experiments with a six- to seven-hour detention time. Sewage was fed at an average rate of 650 ml per hour, and virus was fed at an average rate of 30 ml per hour. Figures 1 and 2 present details of the sludge unit, sewage feed, and virus feed. In initial experiments both sewage feed and virus were mixed in the same container in a ratio of 95 per cent sewage to 5 per cent virus suspension. However, it was observed that the simple mixing of sewage and virus resulted in a loss of plaque-forming units (PFU) as high as 75 per cent or more of the original virus within five minutes of its addition to the raw sewage. This large loss precluded the feeding of virus-seeded raw sewage to the activated sludge unit, because it was technically impossible to add sufficient virus to raw sewage to have a measurable quantity of virus in the activated sludge unit effluent. A virus feed unit was therefore constructed with a 1,000-ml separatory funnel which fed virus into a constant level feed device. The feed device was fitted on one end with a 25-gauge 3/8-in. hypodermic needle. This apparatus allowed virus to drip into the activated sludge unit at an average rate of 30 ml per hour. The separatory funnel was surrounded by cooling coils in order to maintain virus viability and prevent bacterial growth in the virus suspending medium, Hanks's balanced salt solution (BSS). Antibiotics were not added to the virus suspending medium because of the effect they would have on the activated sludge.

Sewage Feed—Settled urban sewage was used as the basic sewage feed in all experiments. The COD of this sewage was quite low, and the sewage was routinely "fortified" with gelatine and homogenized dog food to yield a sewage with an average COD of approximately 300 mg per liter in the continuous feed experiments.

Virus Feed—Stock virus suspensions were diluted in Hanks's or Earle's BSS so that the feed averaged about 8×10^6 PFU per ml for the Coxsackie A9 virus and about 2×10^6 PFU per ml for the poliovirus strain. Virus feed titers remained relatively stable for the 48-hour periods during which the experiments were conducted, providing the feeds were held at approximately 5° C.

Virus Titrations—All virus titrations were conducted by using the plaque technic. African green monkey (Cercopithecus aethiops sabaeus) or rhesus (Macacus rhesus) kidney cell cultures, grown in 6-oz bottles, were prepared by essentially the technic described by Hsiung and Melnick.[9] Fourfold dilutions of the suspension being titrated were prepared in BSS containing penicillin, dihydrostreptomycin, nystatin, and tetracycline, and each of four plaque-bottles inoculated with 0.5 ml of each dilution. Plaque counts were made on the first day plaques became clearly visible, and for one or two days thereafter to insure time for the appearance of slow-developing plaques.

Coliform and Fecal Streptococci Counts—Coliform counts were determined by the membrane filter technics as described in the tenth edition of Standard Methods, except that m-Endo broth MF* was used in medium preparation. Fecal streptococci counts were

* Difco Laboratories, Inc., Detroit, Mich.

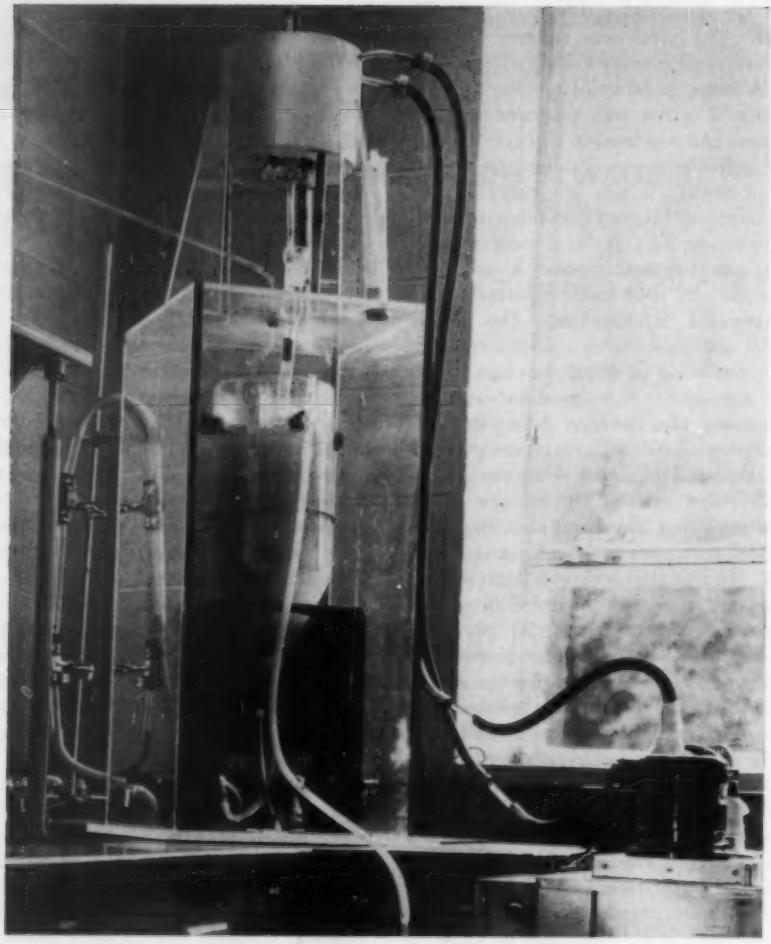

Figure 1—Bench Model Activated Sludge Unit

made using the membrane filter procedure described by Kenner, et al.[10]

Activated Sludge—The sludge used in this study was obtained from a stock unit maintained by F. J. Ludzack of this center. For the purpose of these experiments, three parameters were measured on the sludge obtained for a particular experiment, the sludge density index, which ranged from 1.07 to 3.44, with a mean value of 2.06; the per cent volatile solids, which ranged from 67 to 88, with a mean value of 78; and the per cent nitrogen in the volatile solids, which ranged from 5.3 to 11.9, with a mean value of 9.2. The amount of sludge used to seed the sludge unit was varied according to the particular information desired, and is noted in the experimental details.

A. Preliminary Experiments

Pilot experiments were conducted to determine (I) the effect of primary sewage treatment (settling) on the virus, (II) the effect of aeration on the virus, and (III) the effect of activated sludge (batch type process) on the virus.

I. Primary Treatment—Twenty gallons of raw sewage (not fortified) were placed in a 30-gallon polyethylene drum and seeded with Type 1 poliovirus. The sewage-virus mixture was stirred for about 15 minutes and aliquots were then poured into four-liter serum bottles and allowed to settle for the duration of the study. Samples were carefully removed from the top quarter of the liquid at specified time intervals and checked for virus titer, coliform count, five-day BOD, and suspended solids. The results of

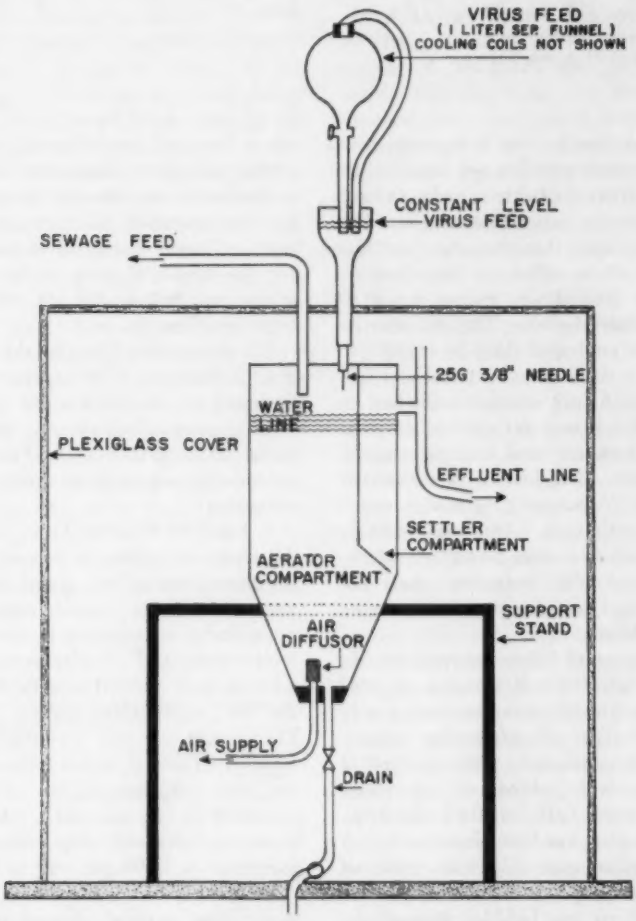

Figure 2—Bench Model of Activated Sludge Unit and Virus Feed System (Schematic Diagram)

Table 1—Effect of Primary Sewage Treatment (Settling) on Poliovirus Titers, Coliform Counts, BOD, and Suspended Solid Determinations

Settling Time*	Average Plaque Counts/0.5 ml		Coliform Counts/ml		Five-Day BOD (mg/1)		Suspended Solids (ppm)	
	Exp. 1	Exp. 2	Exp. 1	Exp. 2	Exp. 1	Exp. 2	Exp. 1	Exp. 2
0	155	185	1.6×10^5	3.7×10^4	64	22	72	19
45 min	150	190	6.3×10^4	3.3×10^4	56	13	49	12
1.5 hr	150	206	6.1×10^4	2.7×10^4	46	9	44	7
3 hr	165	180	1.1×10^5	3.4×10^4	42	10	40	10
6 hr	115	90	1.6×10^5	7.6×10^4	37	8	28	9
12 hr	110	100	2.6×10^5	6.7×10^4	28	9	20	8
24 hr	110	70	1.3×10^5	4.5×10^4	27	6	18	5

* Samples stored at room temperature.

these experiments are summarized in Table 1, which presents the mean values obtained from duplicate samples in each of two separate experiments. From this table it appears that three-hour settling has little if any effect on the virus, although it does slowly reduce the BOD and suspended solids. The coliform results show an initial drop in count, followed by a rise due to bacterial multiplication and finally another reduction in count. The reason for the loss of virus between the three- and six-hour samples is not clear. The loss in experiment 1 was about 26 per cent, in experiment 2 about 55 per cent. It seems unlikely that the loss was due to settling of the virus, since the reduction was not gradual and consistent but occurred rather suddenly.

II. Aeration of Virus Suspensions—In order to determine if aeration as used in the bench model treatment unit would inactivate virus, the following experiment was conducted. Stock Type 1 poliovirus was added to phosphate buffered water (pH 7.2, 0.02 molarity) contained in a five-liter glass bottle. A sintered glass gas dispersion tube of medium porosity was introduced into the bottle, and air was bubbled through the water-virus suspension. Samples were removed periodically and checked for virus titer. Concomitantly, virus was added to buffered water but not aerated to determine the effects of simple storage on virus survival. The results of these tests indicated that aeration and storage for the length of time of these experiments (six hours) did not reduce virus titer significantly.

III. Removal of Virus by the Activated Sludge Process—Pilot experiments were designed to measure the per cent reduction in virus titer when virus was exposed to activated sludge and to determine the mechanisms involved in this reduction.

a. Effect of Aeration Time—Coxsackie A9 virus was added to a bottle containing three liters of water and one liter of activated sludge mixed liquor. The virus-sludge mixture was aerated at room temperature and samples removed periodically were allowed to settle 30 minutes and the supernatant titered for virus. The results of this investigation, presented in Table 2, indicate that about 99 per cent reduction of the added virus occurred in 45 minutes. As aeration time was increased, virus reduction also increased to 99.99 per cent in six hours. A control experiment, in which virus and water were aerated, showed practically no loss of virus in the six-hour aeration period.

These data indicated that the activated sludge process was apparently highly efficient in removing Coxsackie virus from water and additional studies were therefore conducted in an attempt to determine the mechanism involved in this removal. Two different experiments were designed to investigate this mechanism, in one the amount of virus was varied and the sludge concentration held constant; in the other the virus concentration was held constant, while sludge concentrations were varied.

b. Establishment of the Mode of Action of Activated Sludge on Virus—If the removal of virus in the activated sludge process is an adsorption phenomena, the removal pattern should conform to the Freundlich adsorption isotherm: $a/m = uC^n$ where a is the amount of adsorbate adsorbed per unit of adsorbent, m; C is the amount of adsorbate remaining; and u and n are constants. Applying this equation to the sludge-virus system, a becomes plaque-forming units of virus per inoculum (0.5 ml), m the amount of activated sludge as suspended solids in ppm, and C the PFU of virus per 0.5 ml remaining in the supernate after settling. The values of u and n would depend upon the nature of the sludge, virus type, and other variables in the system.

A series of experiments were conducted in which ten-fold serial dilutions of virus were added to two sets of bottles, one containing 2,320 ppm of activated sludge while the other contained 4,960 ppm of activated sludge. All bottles were held at 4° C to minimize microbiological activity were not aerated, but held for 45 minutes. At the end of this time, solids were settled by centrifugation at 1,000 rpm for ten minutes and the supernates titered for virus. The results of these experiments are presented in Figure 3 which shows the ratio of PFU of virus removed to the ppm of suspended solids (a/m) plotted against the PFU of virus remaining in the supernate. The curve for the 2,320 ppm of suspended solids was fitted by the least square method, the other curve was fitted by eye because of lack of sufficient points. The linear log-log relationship between (a/m) and C for both sludge concentrations clearly demonstrates the conformity of these data to an absorption isotherm and allows computation of the values for u and n which are 0.00091 and 0.996 for the 2,320 ppm and 0.00075 and 0.996 for the 4,960 ppm of suspended solids.

Table 2—Effect of Activated Sludge on Coxsackie A9 Virus

Sample Time	Average Plaque Counts/0.5 ml	Per cent Virus Reduction
Initial	54,000	—
45 min	400	99.26
1.5 hr	40	99.93
3 hr	10	99.98
6 hr	1.5	99.99

The values for n in both cases are close to unity, indicating that the per cent of virus adsorbed was constant over all initial virus levels tested, while the very small values of u, and the slight difference between them at the two different sludge concentrations indicates that the sludge floc at 4° C was a relatively poor absorbent and that a significant increase in virus removal could be obtained only by a very large increase in sludge concentration. To confirm this, a/c ratios were examined for homogeneity for each sludge concentration by a "between dilutions vs within dilutions" analysis of variance and were found to be constant within the limits of sampling and counting errors, the geometric mean per cent adsorption being 67.1 and 79.1 for the 2,320 and 4,960 ppm of solids, respectively.

The equation used above, $a/m = uC^n$ may also be written $a/C^n = um$. The

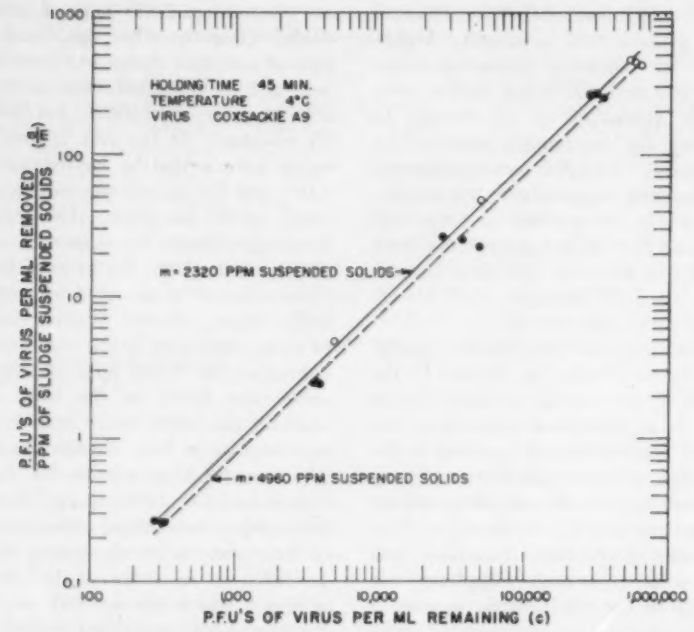

Figure 3—Relationship Between the Ratios of Plaque-Forming Units (PFU) of Virus Removed to PPM of Sludge Suspended Solids and PFU's of Virus Remaining in Supernate

experiments just described showed that the value of n is close to unity, and therefore the ratio of a/C should be directly proportional to m. To test this hypothesis, a fixed amount of virus was added to each of a number of bottles to yield an initial titer of 150,000 PFU. Activated sludge was then added to each bottle in ratios of x, x/2, x/4, x/8 ppm of suspended solids. The virus-sludge mixtures were held 45 minutes at 4° C with intermittent shaking, samples were removed, centrifuged at 1,000 rpm for ten minutes and the supernate titered for virus concentration.

The results of these tests are shown in Figure 4, by plotting on a log-log scale the ratio of the per cent of virus removed to the per cent remaining against the respective ppm of suspended solids. For comparison, corresponding values were also computed from the data of Figure 3 and are shown. Figure 4 shows some scattering of points, but the majority of points lie within the limits of sampling and counting errors. Of interest is the observation that the two points computed from Figure 3 are so located that they show a similar slope, but of somewhat lower removal efficiency. This difference could be accounted for by experimental error, but it may indicate a lower adsorption capacity of the sludge used in the earlier experiment. At any rate, the linear relationship between a/C and m further substantiates that the removal of virus by activated sludge is apparently an adsorption phenomenon.

c. Disassociation of Virus from the

Sludge-Virus Complex—In view of these data, which indicate virus removal by activated sludge is an adsorption phenomenon, a number of experiments were conducted in an attempt to disassociate adsorbed virus from sludge. These experiments were conducted by shaking sludge, to which virus had been adsorbed, in buffer systems with pH values of 4.9, 6.5, 7.2, and 8.5. In addition to these systems, virus-sludge mixtures were shaken with diethylether and 1:5,000 Versene. All extractions were conducted by vigorously shaking the sludge-virus complex in separatory funnels, allowing the sludge to settle for 30 minutes, decanting and titering the supernates for virus. Each sludge-virus complex was extracted three times. These experiments showed that only a small per cent of the virus could be extracted from the sludge-virus complex by any of these procedures, and indicate that the sludge-virus complex is extremely stable or that virus is in some manner inactivated by adsorption to activated sludge.

B. Continuous Flow Type Experiments

The batch type experiments just described indicate that the activated sludge process is effective in removing Coxsackie A9 virus from sewage. However, it appeared necessary to determine the efficacy of the process as it is usually conducted, in a system in which sewage

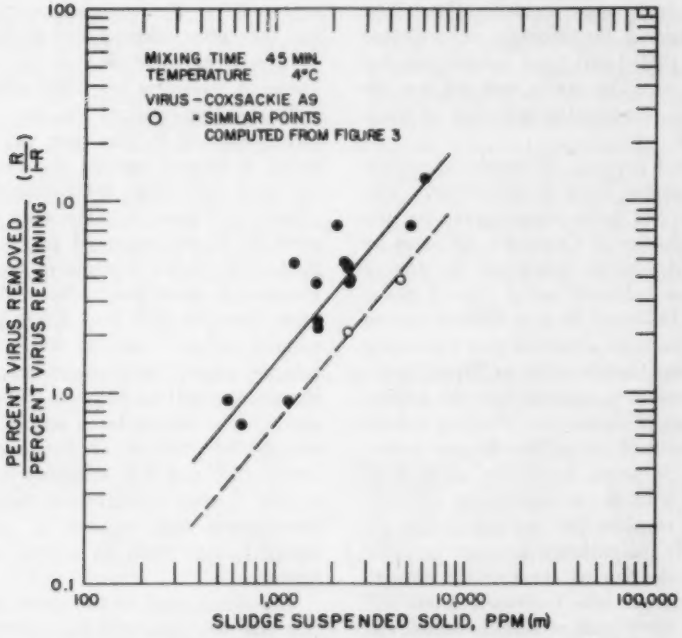

Figure 4—Relationship Between the Ratio of the Per cent of Virus Removed to the Per cent of Virus Remaining and the Concentration of Activated Sludge as Suspended Solids in PPM

Table 3—Removal of Coxsackie A9 Virus by a Bench Model Activated Sludge Unit

Experiment	Volatile Solids (mg/liter)	Initial Virus (PFU/ml)	Effluent Virus (PFU/ml)	Per cent Virus Reduction
1	600	166,000	2,200	98.8
2	650	509,000	20,000	96.1
3	1,000	167,000	1,400	99.2
4	1,100	320,000	2,800	99.1
5	1,500	321,000	8,400	97.4
6	1,500	314,000	2,000	99.4

Average retention time of virus in sludge unit, 7.0 hours (6.0-8.4).

and virus could be continually fed for 48 hours to an activated sludge unit as previously described.

In these studies both Coxsackie A9 and Type 1 poliovirus were used. Table 3 presents the results obtained in a series of experiments with Coxsackie A9 virus. It is apparent from these data that varying the amount of activated sludge (600-1,500 ppm volatile solids) used to seed the sludge unit did not significantly change the per cent of virus removal.

Table 4 presents the results of experiments using Type 1 poliovirus. The data in this table suggest that the per cent reduction of Coxsackie A9 virus by activated sludge treatment is greater than was achieved using Type 1 poliovirus. However, in unpublished experiments we have observed that Coxsackie A9 virus is not as stable as Type 1 poliovirus, and it is possible that the greater reduction of Coxsackie A9 virus reflects the die-off of virus that occurs during the six to seven hours the virus is in contact with the sewage-sludge mixture. It is of considerable interest to note the relatively insignificant increase in poliovirus reduction as the amount of activated sludge was increased from 400 ppm to 4,000 ppm of volatile solids. The jump in amount of virus removed, from 80 to 88 per cent, when the volatile solids were increased from 200 to 400 ppm was probably due to the sludge formation and settling, which was very poor at 200 ppm in contrast to the excellent sludge formation and settling at all other levels.

It should also be noted that in all experiments, with both viruses, the per cent removal of virus was constant during the entire 48-hour test period.

In order to determine if the data of Table 4 conform to the adsorption isotherm, the ratio of the per cent of virus removed to the ppm of volatile solids is plotted against the respective per cent of virus remaining in the effluent in Figure 5. The data show a good fit of the observed points to the theoretical curve computed from the Freundlich adsorption isotherm at sludge levels between 400 and 4,000 ppm of volatile solids. Below 400 ppm of volatile solids, the curve bends rather sharply toward the point of 200 ppm of solids. The values for u and n for the straight-line section of the curve are 6.4×10^{-5} and 3.3, respectively. The results further substantiate the earlier observations that removal of virus by sludge is apparently an adsorption phenomenon.

The sharp bend in the curve between 200 and 400 ppm of solids clearly indicates that virus removal at the lower sludge level is much less than would be dictated by the isotherm. It appears

that the activated sludge process requires a certain minimal concentration of activated sludge if it is to be efficient.

Since earlier investigations had demonstrated that a high per cent of virus was "lost" by simple mixing with sewage, an experiment was conducted in which no activated sludge was used to seed the sludge unit, only "fortified" sewage and Type 1 poliovirus being fed to the unit. The results from this experiment showed that a 60 per cent reduction in virus titer was achieved by allowing sewage and virus to mix for a six to seven hour period in the bench model activated sludge unit. This loss of virus was comparable to earlier observations in which losses up to 75 per cent or greater occurred within five minutes of simple mixing of virus and sewage. It thus appears that the suspended solids and other colloidal material in sewage, and perhaps toxic substances, contributed to a substantial portion of the reduction in virus when virus is treated by the activated sludge process.

A number of investigations were also conducted with the activated sludge unit to determine its effectiveness in removing coliform and fecal streptococci organisms. A series of five experiments demonstrated a mean coliform reduction of 97.0 per cent, with a range of from 95.0 to 99.7 per cent and a mean fecal streptococci reduction of 95.6 per cent, with a range of from 93.8 to 97.0 per cent.

COD measurements were made for each experiment reported in this paper. All effluents had approximately the same COD values, with a range of from 90 to 145 mg per liter and a mean value of 109 mg per liter. Sewage feed COD measurements ranged 172-590 mg per liter, with a mean value of 307 mg per liter. Suspended solids measurements of the effluent always yielded values of less than five mg per liter.

Discussion and Summary

The data presented in this paper indicate that the activated sludge process is an effective method for removing at least two different enteric viruses from sewage. Since the mechanism of removal of virus by activated sludge appears to be an adsorption phenomenon, it is reasonable to infer that other members of the enteric virus group would also be removed from sewage by such treatment. The ultimate fate of the adsorbed or inactivated virus was not determined, although a number of various technics were tried in an attempt to release virus presumed to be adsorbed to

Table 4—Removal of Type 1 Poliovirus by a Bench Model Activated Sludge Unit

Experiment	Volatile Solids (mg/liter)	Initial Virus (PFU/ml)	Effluent Virus (PFU/ml)	Per cent Virus Reduction	Sludge Formation and Settling
1	200	67,000	14,000	79	Very poor
2	400	68,000	8,000	88	Good
3	600	64,000	6,200	90	Good
4	600	53,000	5,000	91	Good
5	1,200	100,000	8,000	92	Good
6	1,200	40,000	3,600	91	Good
7	4,000	56,000	3,600	94	Good

Average retention time in sludge unit, 6.7 hours (6.0-7.5).

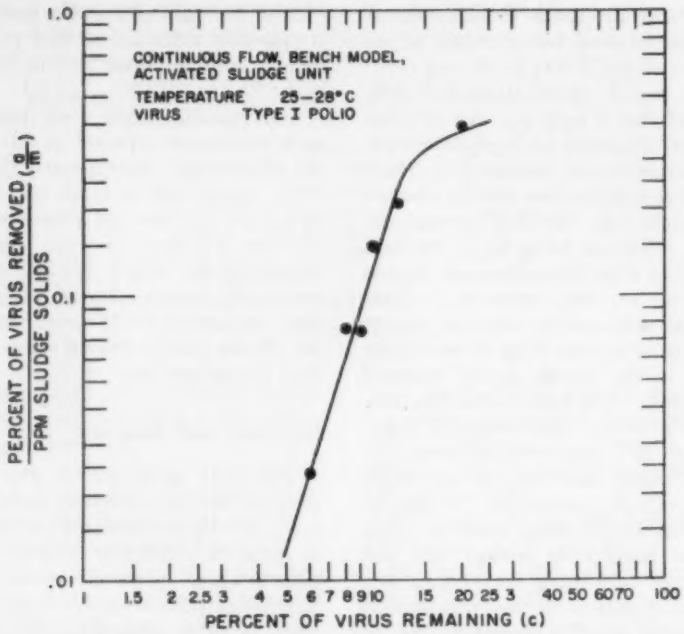
CONTINUOUS FLOW, BENCH MODEL,
ACTIVATED SLUDGE UNIT
TEMPERATURE 25–28°C
VIRUS TYPE I POLIO
PERCENT OF VIRUS REMOVED (p/m)
PPM SLUDGE SOLIDS
1.0
0.1
.01
1 1.5 2 2.5 3 4 5 6 7 8 9 10 15 20 25 3 40 50 60 70 100
PERCENT OF VIRUS REMAINING (c)

Figure 5—Relationship Between the Ratio of Per cent Removal of Virus to Concentration of Activated Sludge and the Per cent of Virus Remaining in the Effluent

the sludge. Only a very small per cent of virus could be recovered, indicating that the sludge-virus complex is extremely stable or that most of the virus is in some manner inactivated.

The bench model continuous-flow activated sludge unit used in these experiments was operated with a six to seven hour retention time and was seeded with activated sludge in amounts ranging from 200 to 4,000 ppm, expressed as volatile solids. Excepting with the 200 ppm seed, the unit removed approximately 90 per cent of Type 1 poliovirus and about 98 per cent of Coxsackie A9 virus. Coliform and fecal streptococci removals averaged about 97 and 96 per cent, respectively. It was also demonstrated that about a 60 per cent reduction of Type 1 poliovirus could be achieved by feeding sewage and virus through a bench model unit containing no activated sludge. This indicates that the suspended solids and colloidal material, and perhaps toxic substances, in raw sewage also play a role in the reduction of virus as virus is treated by the activated sludge process. Activated sludge undoubtedly removes the major portion of the sewage-virus complex, in addition to most of the remaining free virus in sewage.

Studies designed to determine the effect of primary treatment on virus demonstrated that no significant loss of virus occurred with a three-hour settling time, but that some loss occurred between six and 24 hours of settling. This

laboratory observation confirms the observation of Kelly, et al.,[1] who were able to isolate viruses from the effluent of primary treatment plants with some regularity.

The only study of which we are aware in which effluent from activated sludge treatment plants has been examined for virus was reported by Mack, et al.[6] Their report showed that enteric viruses could be isolated from unchlorinated effluents with considerable regularity. Unfortunately, the amounts of virus in neither the raw sewage nor effluent were determined, but it was observed that a higher per cent of settled sludge samples yielded virus than did raw sewage. Their report, coupled with our observations, would indicate that although activated sludge does remove 90 per cent or greater of enteric viruses added to sewage, it must be coupled with additional treatment (disinfection) if a virus-free effluent is sought.

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This paper was presented before a Joint Session of the Conference of Municipal Public Health Engineers, the Conference of State Sanitary Engineers, and the Engineering and Sanitation Section of the American Public Health Association at the Eighty-Eighth Annual Meeting in San Francisco, Calif., November 1, 1960.

"As a child, studying the Bible in Sunday School, I read of the 'miracles,' and often wondered if ever it would be my lot actually to see a miracle. I can truly say near the end of a long life in the field of preventive medicine that I have not only seen, but participated in, one of the greatest miracles that the world has ever seen. 'Those who were dead are now alive.'"

(Wilson G. Smillie, M.D. Experiences in Preventive Medicine. 1957.)

The rapid development of new dwelling areas after the Second World War led to the mass use of individual water supplies and sewerage systems. The authors present evidence of the ground water contamination that has been caused as a consequence.

EXPERIENCES WITH GROUND WATER CONTAMINATION IN UNSEWERED AREAS IN MINNESOTA

Frank L. Woodward, B.E., M.P.H., F.A.P.H.A.; Franklin J. Kilpatrick, B.Ch.E., M.P.H.; and Paul B. Johnson, B.C.E.

FROM the beginning of the post-war housing boom, individuals and agencies responsible for the protection of the public health have expressed concern regarding a variety of potential health and nuisance problems in the mass use of individual water supplies and sewerage systems in developed areas. At first the fears were based almost entirely on past experience with older communities, where lack of space, unsuitable soil, and ineffective local control had led to countless sewage nuisances and instances of direct contamination of individual wells by associated individual sewerage systems. As the population exploded into new areas ahead of central services, and as the demand for water approached and exceeded the rate of ground-water recharge by precipitation, another anxiety arose. Cause for this new worry was the logical conclusion that water drawn from the ground by means of numerous wells, if returned to the same ground in the form of sewage, will inevitably circulate and progressively deteriorate in quality.

In a discussion of the Minnesota situation it should be stated that in a large part of the state, ground water is readily available at depths of from 20 to 100 feet, and that much of the soil, particularly in the metropolitan area of Minneapolis and St. Paul, is favorable to subsurface disposal of sewage. For this reason, and lacking local control of platting and water development, home builders have proceeded to install thousands of homes with on-site water and sewage disposal, giving no consideration to the generally obvious fact that such systems, in areas of high population density, can only be regarded as temporary. By January, 1960, over 400,000 persons in the Twin City suburbs were being served by such facilities.

The geology of the state of Minnesota is extremely variable. Sections of the state are underlain by original igneous rock, whereas in other sections the consolidated formations are of the relatively young Mesozoic age. In still other sections, including the Twin City area, the underground formations are a sequence of sedimentary rock formations of the Paleozoic age consisting of alternate layers of sandstone and limestone. The surface mantle varies in depth from a few inches in some cases to several hundred feet in others, and consists of a wide variety of deposited material. In some areas the materials are quite uniform in texture, consisting of sand and gravel layers to a depth of 100 feet or more. In other areas they are non-

uniform, consisting of sand, gravel, till, boulders, and so forth.

The first public expression of concern by the Minnesota Department of Health was made in 1950. Responding to an inquiry from a large suburb of Minneapolis relative to the advisability of replacing individual water supply and sewerage systems with central facilities, the department warned that with continued reliance on such systems, sewage would ultimately constitute a large part of the ground water being used, and prompt installation of central systems was recommended. This warning has proved to be prophetic. In 1959, over 40 per cent of the water supplies in this community were found to yield water containing elevated concentrations of sewage chemicals.

First Demonstration of Circulation

As the spread in dates indicates, a number of years separated prediction and demonstration of recirculation of sewage in ground water. In the absence of precedent, the department did not anticipate widespread demonstrable effects on ground water quality and, consequently, did not comprehensively investigate the matter before the spring of 1959. By that time isolated cases of recirculation had come to light in various parts of the country. Notable among these was the experience in Suffolk County, N. Y., where numerous domestic and industrial wells were found to be contaminated by various chemicals, including synthetic detergents, from industrial wastes and household sewage disposal systems. In view of these experiences the authors began to anticipate the incidence of such ground water contamination within the state of Minnesota to a limited extent and in isolated instances. Widespread and extensive contamination of this nature, however, was not expected.

In April, 1959, at the request of the owner and the local health officer, the department investigated an individual well water supply serving a residence in the post-war unsewered village of Coon Rapids. Because illness in the household coincided with taste in and foaming of the water, thus pointing to sewage contamination, samples of water were quantitatively analyzed for nitrate, surfactant, and coliform organisms. For purposes of comparison a similar investigation was made of the neighbor's facilities.

The well of each household was approximately 30 feet deep, developed in the drift, and equipped with an ejector type pump discharging to a pneumatic tank. Each well was located, with respect to sewerage, in general accordance with accepted standards. Sewage disposal was by means of septic tanks and seepage pits, which were reported to be about 18 feet deep. The water from the household at which the complaint had originated was found to contain 11 parts per million of nitrate nitrogen, 1.1 parts per million of surfactant, and no coliform organisms. Agitation of the water in a glass produced a distinct layer of foam which persisted for about one minute. Water from the neighboring household contained 7.6 parts per million of nitrate nitrogen, 0.91 part per million of surfactant, and no coliform organisms. Agitation of this water failed to produce foaming. Owing to the presence in both cases of significant concentrations of synthetic detergent, and because the concentration of nitrate nitrogen found in both cases was well above the anticipated natural level of this chemical in the ground water of the area, these water supplies were regarded as being of very questionable sanitary quality, and the householders were advised to discontinue use of the water for drinking and cooking purposes.

More important, however, was the consideration that followed. The village had a population of over 10,000, with

about 3,300 homes and business establishments. All were served by individual sewage disposal systems of the septic tank-soil absorption type, and, with the exception of about 360 homes served by a central water system, all of the homes and establishments obtained their water from individual wells which varied in depth from approximately ten feet to over 100 feet. The vast majority of these wells were 25 to 40 feet in depth. Accordingly, the question was raised whether or not the phenomena observed at the two homes investigated were prevalent throughout the community. This consideration was presented to the local officials with the recommendation that a community-wide survey be undertaken to establish the facts. This recommendation was enthusiastically accepted and a survey was planned and undertaken.

The Survey

The survey consisted of the collection of samples of water from a statistically representative number (98) of individual water supplies selected at random throughout the village, and the chemical examination of these samples for nitrate, surfactant, and chloride concentrations. These chemicals were chosen as the objects of analysis for the following reasons: (1) The natural occurrence of nitrate in more than trace amounts in the ground waters of much of Minnesota, including the east-central section, is not common. Consequently, this chemical could be used as a good indicator of the mixing of sewage water with ground water. (2) If nitrates of sewage origin were reaching concentrations of ten parts per million and more in the ground water, a threat to infant health would be involved. (3) Because surfactants are synthetic components of detergents, their presence in ground water supplies can be related only to disposal of sewage to the ground, in the absence of any other explainable cause. (4) Exchange-type water softeners were commonly used in Coon Rapids. Therefore, it was thought that chloride from this source and from human waste in sewage might reach abnormal concentrations in the ground water if any considerable amount of sewage water were entering the water-bearing formations.

The results of the survey analyses were startling. Of the supplies examined, 62.2 per cent were found to yield water containing nitrate nitrogen in significant concentrations varying from one to 21 parts per million. The water from 10.2 per cent of the total contained nitrate nitrogen in concentrations of ten parts per million or more, and 23.6 per cent contained surfactants. Each surfactant finding was associated with a significant nitrate concentration, and there was good correlation between the concentrations of nitrates and of surfactants. There was little if any correlation between the concentrations of chloride and the concentrations of the other two chemicals. Nine of the water supplies which contained the most significant amounts of nitrate and surfactant were later examined for the presence of coliform organisms, with negative results.

Current Status of Surveys

The findings in Coon Rapids led to widespread concern on the part of numerous other metropolitan suburbs served by individual systems. As of September 1, 1960, similar surveys have been undertaken in 39 communities of the metropolitan area involving over 63,000 individual wells serving about 60 per cent of the 400,000 people depending on such systems. The findings in these communities, generally speaking, have been equally startling. Of the more than 63,000 wells involved, about 47½ per cent, or some 30,000, have been shown to be contaminated, as evidenced

by the presence in the water of nitrates or surfactants of sewage origin. Of these, 10.6 per cent, or about 6,740, yield water containing nitrate nitrogen in concentrations of ten parts per million or more, and the waters from 21.8 per cent, or 13,800, contain measurable quantities of surfactant. There has been a considerable range of findings from community to community and in individual cases. In one of the communities no wells were contaminated, and five communities have had all of their wells contaminated. The concentration of chemicals in the water has varied in individual cases from a trace to an amount sufficient to indicate complete or multiple recirculation of sewage. In younger (post-war) communities, 10 to 20 per cent of the wells most seriously affected by sewage chemicals also are contaminated bacteriologically, as evidenced by coliform organisms in the water. In older communities as much as 50 per cent of all supplies are so affected.

Incidental to the surveys of ground water supplies in the metropolitan area of Minneapolis and St. Paul, surveys have been conducted in nine widely scattered out-state communities. The findings of these surveys have been in all ways comparable to those of the metropolitan area.

Projection to Other Areas

Several factors have influence on general contamination of ground water in unsewered communities. These factors have been tested and their influence has been demonstrated in Minnesota. They are: well depth; population density; character of soil; time; and direction and speed of ground water movement.

In a typical post-war community with relatively level topography, and in which ground water is available at relatively shallow depths in unconsolidated surface mantle, well depth is in general directly related to the frequency of occurrence of contamination effects. Table 1 illustrates this point.

In communities similar except for variation in topography, the same pattern emerges if relative elevations at well bottom are substituted for well depths.

In older communities with similar physical features the fact becomes evident that, with time, sewage contaminants penetrate to and affect ground water at deeper levels. Moreover, the contaminants become more uniformly spread throughout the various levels. This point is illustrated by Table 2.

Population density determines basically the sewage load per unit of land area. In two regions of one village with population densities of 0.54 and 2.7 per acre, the corresponding percentages of wells contaminated were 2 and 29.4, respectively. However, to avoid a hasty conclusion that regulation of lot size may effectively control this problem, the point is made that an older neighboring community with a population density between 0.5 and 1.0 per acre was found to have 14 per cent of its wells affected.

The influence of ground water movement is best illustrated by the experience in one suburb in which the ground water travels from west to east toward the

Table 1—Relation of Well Depth to Occurrence of Nitrate in Well Water of One Typical Post-War Community

Well Depth Range in Feet	Number of Wells Examined	Nitrate Nitrogen > 1 ppm	
		Number	Per cent
0- 25	8	4	50
26- 50	18	5	28
51- 75	8	3	37
76-100	13	1	8
101-125	0	—	—
126-150	1	0	0
151-175	1	0	0
176-200	2	0	0

Table 2—Relation of Well Depth to Occurrence of Nitrate in Well Water of One Typical Older Community

Well Depth Range in Feet	Number of Wells Examined	Nitrate Nitrogen > 1 ppm	
		Number	Per cent
0- 50	6	4	67
51- 75	10	5	50
76-100	21	15	71
101-125	5	5	100
126-150	3	2	67
151-175	1	0	0

Mississippi River. As might be expected, a low percentage of the wells in the heavily developed area at the west side of the village produced water with significant nitrate or surfactant concentrations, whereas, the frequency of occurrence of these chemicals in well waters increased with distance eastward across the community.

The influence of soil characteristics on contamination travel has been found to vary considerably. In some communities, wells which penetrate several layers of clay have been found affected. In others, including the one having no wells affected, clay soil has appeared to be the factor which has furnished protection. Various conclusions may be drawn from this. Most logical, perhaps, is the conclusion that in the one instance the clay layers are continuous and undisrupted over a wide area, whereas, in the other instance only islands of clay exist or the clay has failed to settle around a number of well casings. In areas where limestone aquifers are near the surface of the ground, all wells are generally affected with sewage chemicals, and bacterial contamination is common.

Although reports of this type of experience in other states were lacking, the authors could not believe that similar conditions were not developing elsewhere. Accordingly, an inquiry was addressed to all state sanitary engineers. Unfortunately, the questions asked left the impression that the principal concern was with detergents, whereas it was hoped that the replies would reflect any experience with general sewage contamination of ground water. With a half-dozen exceptions the replies indicated that no problems had come to light, although many of the state sanitary engineers recognized the possibility. Some felt that the problem could not occur in their states owing to the difficulties involved in developing individual ground water supplies. In view of the wide range of geological conditions involved in ground water contamination in Minnesota, there is every reason to presume that throughout the nation, and for that matter throughout the world, where developed communities are served by individual water supplies and individual sewage disposal systems of the soil absorption type, contamination of the ground water may be anticipated in a relatively short period of time.

Significance of Nitrate and Surfactant as Indexes of Contamination

From the literature and other sources of information available, there appears to be no reason to suppose that nitrate in the concentrations found in any of the ground water of the state of Minnesota is capable of producing undesirable physiological effects in anyone other than a bottle-fed infant. Also, in so far as can be determined, surfactant is not toxic in the concentrations that are appearing in the ground water. Why then, other than for aesthetic reasons, should there be concern over the appearance of these sewage chemicals in the water supplies unless the nitrate nitrogen concentration is excessive. The answer to this question involves a number of considerations.

Nitrates may be classified as inorganic chemicals, whereas, surfactants are or-

ganic chemical compounds. If these chemicals can be carried with sewage into the ground water reservoir and thus become impurities in the ground water, other organic and inorganic chemicals which are soluble constituents of sewage may also find their way into the ground water. These chemicals, therefore, are indexes of sewage contamination and may be regarded as an indication that other soluble sewage chemicals may be present in the water. There is no way of knowing, in any individual case, when a quantity of toxic chemical material may reach a well, nor is there any way of knowing what may be the undesirable physiological effects of consuming various sewage chemicals in small quantities over extended periods of time. Neither is there any way of knowing in individual cases how much time is required for bacterial contamination to follow chemical contamination. Because so little is known about the behavior of viruses in ground water, a question naturally arises as to whether or not pathogens of this nature may also be found in the water in numbers sufficient to produce infection. The occurrence of coliform organisms in up to 50 per cent of the well water supplies in older communities, and in from 10 to 20 per cent of the water supplies most seriously affected chemically in younger communities, indicates that there is a bacteria breakthrough as a result of the massive loading of the ground with sewage. There appears to be only one logical conclusion that can be drawn from these considerations; when the quality of the ground water has been materially altered as a result of the introduction of chemicals of sewage origin, individuals are no longer secure in the use of the water for drinking or as a food ingredient. Certainly, when the concentration of nitrate nitrogen in a water supply reaches or exceeds ten parts per million, the water is unsuitable for use in the preparation of infant formula. If the contamination has advanced to the extent that coliform organisms are present, the water is unsuitable for drinking or culinary purposes of any kind.

On the basis of this conclusion the Minnesota Department of Health has advised individuals not to use water containing surfactant or sewage nitrate for drinking or for cooking purposes, if any considerable quantity of the water is retained in the food, and has urged the provision of central water supply systems in affected communities. The department has also urged affected communities to regulate by ordinance the construction and reconstruction of individual wells during the interim preceding central water supply installation. In many cases survey findings have established the vertical dimensions of the contamination zone, and thus specific well depth requirements can be included in such ordinances. Because continued disposal of sewage into the ground will ultimately lead to contamination of deeper water-bearing formations in which sources of public water supply are developed, communities have also been urged to install central sewage collection and disposal systems.

A word of caution is offered for the benefit of anyone who may undertake the measurement of ground water contamination by means of analysis for nitrate. Determination of natural nitrate levels in the ground water of any area is necessary before such analyses are meaningful, and only quantities of this chemical in excess of those contributed by natural sources in the ground may be considered as evidence of contamination. In special cases nitrate in the ground water may be evidence of contamination from sources other than sewage. Seepage from garbage buried beyond availability to plant roots and surface soil bacteria can also carry nitrogen compounds into the ground water. In one instance excessively high nitrate concentrations in the water drawn from

wells in a suburb were related to seepage from a hog-feeding operation which was abandoned and the surface covered to make way for a housing project. Nitrogen compounds may also be carried deep into the underground formations by rapid infiltration of surface water. Nitrate from surface contamination thus commonly occurs in thinly covered limestone aquifers.

It is hoped that the experience with ground water contamination in Minnesota may bring to earlier attention the existence or potential of such contamination elsewhere, and thus prevent or limit the needless hazards and expense that result. The Minnesota Department of Health is proceeding as rapidly as possible to evaluate the factors involved in ground water pollution by subsurface disposal of sewage. Thorough knowledge of these factors can be utilized in effective promotion of orderly community development.

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This paper was presented before a Joint Session of the Conference of Municipal Public Health Engineers, the Conference of State Sanitary Engineers, and the Engineering and Sanitation Section of the American Public Health Association at the Eighty-Eighth Annual Meeting in San Francisco Calif., November 1, 1960.

Research Grants in Environmental Health

The Public Health Service's special program for research grants in the field of environmental health became operational in November, 1960. Research project applications will be assigned to a participating Division of the Bureau of State Services. The new divisions and the staff members who will deal with applicants in the areas of environmental health are: Water Supply and Pollution Control: Harry A. Faber, chief, Research and Training Grants Branch; Engineering Services: Harold B. Robinson, chief, Research Grants Branch; Air Pollution: Maurice Bender, Ph.D., chief, Research and Training Grants Branch; Radiological Health: P. F. Hahn, Ph.D., chief, Office of Extramural Grants (also see page 1157, this issue); Occupational Health: W. Clark Cooper, M.D., acting research grants administrator; Accident Prevention: Leon G. Goldstein, Ph.D., chief, Research Grants Section.

These divisions are to have responsibilities similar to those of the categorical Institutes and the Division of General Medical Sciences of the National Institutes of Health in the encouragement and support of research and investigations in environmental health. No changes are to be made, however, in the submission and review practices presently in force for all research grant applications. Applications should be sent to the Division of Research Grants, NIH, Bethesda, Md., by November 1 for the March, 1962, meetings.

The various programs of hospital and medical services provided by Maryland for the indigent and the medically indigent are described here. The means by which an endeavor is made to achieve an integrated approach are discussed, as are problems of cost.

MARYLAND'S APPROACH TO INTEGRATED MEDICAL AND HOSPITAL SERVICES

Perry F. Prather, M.D., F.A.P.H.A.

MARYLAND'S program for the care of its low-income citizens has been years in development. Starting in 1803, with what is now known as the Hospital Inpatient Program, it was considerably accelerated in the last 15 years. During this period a number of new programs were inaugurated, so that we now have what can be called "progressive care" for the low-income citizens of Maryland. Our programs range through home and office care, outpatient services, general hospital care, construction of medical facilities, hospital licensing, hospital services for persons with chronic illness, and local health services.

Home and Office Medical Care Program

The impetus for the establishment of the medical care programs came from the medical profession. The first step was an open letter in 1939 sent by the State Medical Society to the State Planning Commission, a public agency created by law to deal with "subjects affecting the health and welfare of the people." A committee of the Planning Commission surveyed the medical facilities and needs of the citizens of the state. Among other recommendations, this committee proposed the plans which became known as the "County Medical Care Program" and the "Baltimore City Medical Care Program." The committee recommended that responsibility for administration rest with the State Health Department. Enabling legislation was passed in 1945, and the medical care program for the indigent and medically indigent residents of the counties began operation in July of that year.

The program in Baltimore developed later. In 1944, a special subcommittee of the Committee on Medical Care of the Planning Commission surveyed the medical care needs of Baltimore and proposed a medical care plan for public assistance recipients to be administered by the City Health Department. This plan began operation in August, 1948.

In the counties, the program serves the indigent, defined as recipients of public assistance, and the medically indigent, defined as normally self-supporting persons who are unable to meet the cost of medical care. Eligibility determination for indigents is handled by the Department of Welfare since public assistance recipients are automatically eligible for the program. The determination of eligibility for the medically indigent, a variable and somewhat elusive segment

of the population, is the responsibility of the county health departments. For administrative purposes, established income scales, graduated by size of family and living costs in the counties, serve as standards for medically indigent eligibility determinations. County health officers have the authority to grant exceptions to the income scales in cases of unusual medical or social circumstances.

Medically indigent persons apply for enrollment in the face of actual medical need, and so represent a "sick" group. They are enrolled for various periods of time, depending on medical need and social and economic factors, but are limited to a maximum coverage of six months unless reapplication is made. The indigents are enrolled for a period of six months regardless of medical needs but are recertified at the end of this period if still on the welfare rolls. Each person or family accepted under the program is given an identification card indicating the expiration date of coverage. The program in Baltimore has so far been limited to the indigent. Certifications are issued for a maximum period of nine months, subject to recertification if the individual continues on the welfare rolls.

The programs cover about 2 per cent of the population of the state, with an average combined enrollment of approximately 70,000 people. The cost of providing service, exclusive of administrative costs, is about $2,500,000 per year.

Each program has been planned specifically for the community area in which it operates. In the counties where the specialized services of hospital outpatient departments are not generally accessible or available, the plan is centered on the services of physicians in private practice. The program offers physician's service in the home or office. There are provisions for consultations with specialists, and for x-ray and laboratory services performed in the physician's office when these are not available through health department facilities. Somewhat limited dental services are included, with primary emphasis on relatively complete service for children and young adults. Dentures are provided, but authorization for this comparatively expensive item must be obtained in advance. Drugs and some medical supplies as prescribed by the physician are also provided.

The patient who needs care seeks service from the physician, dentist, or pharmacy in the community. He has complete freedom of choice, the doctor, dentist, or pharmacist may also accept or reject the patient. This program, with the addition of several components such as more bedside nursing and homemaker service, is gradually being developed into local home care programs.

Hospital Outpatient Program

Under the Hospital Outpatient Program the patient has available services which are beyond the scope of the physician's work in his office or the patient's home but at a level not requiring the patient to occupy a bed in the hospital. This program, we feel, saves hospitalization in two ways: The diagnostic services are available to the patient on an ambulatory basis, thus obviating the need for the patient to be admitted to a hospital. The follow-up services available under both the Medical Care Program and the Outpatient Program make it possible for the hospital inpatient to be discharged at an earlier date, with the assurance that the necessary follow-up services will be provided.

Funds on an equal matching basis are available for hospital outpatient services to patients from the counties and Baltimore. For Baltimore city residents, hospitals are reimbursed for outpatient services to medically indigent persons and those indigents who are awaiting coverage under the Baltimore City Medical Care Program. Eligibility is determined by the hospitals, subject to review by the Baltimore City Department of Public

Welfare. Payments to hospitals for services rendered are based on cost or a flat rate of 80 per cent of the city-wide weighted average cost per visit, whichever is less.

Hospitals are reimbursed for outpatient diagnostic and treatment services to county residents referred by physicians as indigent and medically indigent patients. Payments to hospitals are made at cost or the flat rate of $2.50, whichever is less, plus fees for special services in accordance with a schedule established by the State Department of Health. Bills submitted by the hospitals for services rendered are initially reviewed by the local health officer for eligibility and conformity with regulations established by the State Department of Health. Subsequent audits are made by the State Department of Health before payment.

General Hospital Inpatient Program

The Hospital Inpatient Program under which funds are used to reimburse hospitals for the cost of care given indigent and medically indigent patients had its beginning in 1803 when hospitals appealed to the legislature for appropriations to cover their deficits. Since then, the program has had a varying history. From its beginning when lump sum appropriations were made to hospitals to cover their deficits—to keep the doors open—it has evolved as a program under which the hospitals are reimbursed at 80 per cent of cost and are accountable for cost and statistical reporting. After it took on the aspects of a program rather than appropriations to individual hospitals, it was handled by what is now the Department of Public Welfare. In 1949 it was transferred to the State Department of Health.

This program provides state aid toward the cost of inpatient care for indigent and medically indigent residents of the state in 37 general and seven special hospitals. Eligibility for state aid in these hospitals is determined by the local department of public welfare. Hospitals are authorized to make collections from medically indigent patients to the extent that the families' resources permit.

During the past years this program has had important revisions. Before 1938, reimbursement to hospitals was limited to a negotiated ceiling. The ceiling was raised at intervals from $5 per patient day in 1946, to $13 in 1958. In 1959 a formula with an escalator was substituted for the negotiated ceiling. The ceiling was 60 per cent of the state-wide weighted average cost per patient day or billings, whichever was less. Under this procedure the ceiling would follow cost. It went to $14.40 and then to $15.76. This, it developed, was not equitable. The high cost hospitals with broad scope of service received the same rate as the average hospital.

Since January 1, 1960, we have been paying 80 per cent of each individual hospital's average cost per patient day. This higher rate of reimbursement makes necessary a closer supervision of patients and a more detailed audit of hospital costs.

Formerly, program regulations required medical review and recommendation by hospital staff members, and review and authorization by the Health Department for patients requiring more than 26 days care in general hospitals.

Since January 1, 1960, hospitals have been required to notify the department of the admission of each state-aided patient within three days of admission. They supply a provisional diagnosis and an estimate of the required period of hospitalization. This is reviewed by our staff physician and approved or discussed with the hospital staff physician. Requests may be made for extension of the originally authorized time. Such requests are reviewed in the same manner as the original request.

The department has an active program to assist general hospitals in the reloca-

tion of patients no longer requiring inpatient care. Under our program political subdivisions may and are encouraged to supplement the state payment. Supplemental payments by local government vary from nominal amounts in lump sum grants to appropriations paid to the hospital on a per diem basis covering anywhere from $3 per approved day to the full differential in cost between the state payment and the reported cost. Since only one county pays the full differential between the state rate of reimbursement and the cost, there remains a challenge to the hospital and political authorities to resolve between themselves the question of hospital reimbursement or deficits.

A report has been prepared for consideration of the 1961 legislature in which it is recommended that local matching be compulsory but graduated according to the economic status of the local area.

The one county which pays the full differential, during the five years of participation, has been using a reporting and reviewing procedure like that described above. The three hospitals in that county have the shortest average length of stay for state-aided patients. Judging by this demonstration, the newly instituted procedure is expected to be effective in keeping admissions and length of stay limited to necessary hospitalization.

Since the new procedures became effective, the average length of stay of all state-aided patients has been reduced by a half-day. Hospitals are reimbursed for approximately 20,000 patients per year. With a half-day reduction in the length of stay, there should be a saving of 10,000 days for the year. At an average rate of reimbursement of $22.30, this should result in a saving of $223,000. When converted to beds at 80 per cent occupancy, this would save the use of 35 beds.

Across the nation hospital costs have received considerable attention, particularly when related to Blue Cross premiums and payments. Much has been said on this subject and many states have had official hearings on the question of Blue Cross rates. Since Maryland is reimbursing hospitals at 80 per cent of the individual hospital's cost, it also is concerned about what goes into the cost per patient day.

In order to provide a sound basis for reimbursement and to assure the legislature and the public that tax funds are properly expended, we in Maryland have established an agency known as the Hospital Cost Analysis Service, Inc. The hospitals no longer submit separate cost statements to Blue Cross, the State Department of Health, and the Hospital Council. These three organizations are jointly financing the Hospital Cost Analysis Service, Inc., an autonomous, nonprofit corporation set up to review and analyze hospital costs and to certify the cost per patient day. The service will employ certified public accountants, cost analysts, and staff necessary to review the cost statements submitted by the hospitals and inquire into the propriety of reported items. This, of course, does not replace the private auditing firms employed by the hospitals. The final determined cost per patient day is submitted to the participating organizations and the state insurance commissioner. This cost is used by the organizations as the base for their payments.

Projected Nursing Home Construction Program

The State Department of Health in Maryland is responsible for administering the Medical Facilities Construction Program, commonly known as the Hill-Burton Program. As all states are participating in this program, it is not necessary to dwell on the details. Under the Wolverton Amendment to the Hill-Burton Program, federal funds are available for the construction of certain types of facilities, including nursing homes. Since 1954

when the Wolverton Amendment became effective, we have had only two applications for projects which would provide nursing home facilities. This is in spite of the obvious need for nursing homes sponsored by nonprofit and public groups primarily to serve the low-income groups.

The State Board of Health will request the 1961 legislature to appropriate funds to be used to match state and local funds for the construction of nonprofit nursing homes. It is expected that if grants of state and federal funds are made available in sufficient amount to cover two-thirds of the cost of building and equipping nonprofit nursing homes, there will be eligible applicants for the funds and additional nursing home beds will be provided. Priority would be given to nursing homes affiliated with or part of general hospitals. Studies show that at all times in the state chronic disease hospitals and the state-aided general hospitals, beds are being occupied by patients whose needs could be met in nursing homes. Therefore the conclusion has been reached that if nursing home beds are provided this would be equivalent to providing general and chronic disease hospital beds because of the relief it will afford.

Hospital Licensing Program

All public and private hospitals, nursing homes, and convalescent homes in the state which care for two or more unrelated persons are licensed annually through a series of regular and special inspections for sanitation, nutrition, safety, fire hazards, and compliance with standards and regulations as to space allotments, facilities, personnel, and the like. Inspection services of other agencies in specialized fields are utilized, such as state and local fire authorities, and state and local sanitarians. Hospital advisors, who are registered nurses with degrees and special experience in this field, visit the institutions to give advice on nursing and other administrative problems in addition to ascertaining whether institutions comply with Health Department standards and regulations. The Division of Hospital Services has actually become an information center for hospital workers; this helps to maintain cordial relationships between hospital administrators and the department. In cooperation with the University of Maryland, annual institutes on nursing home administration are conducted for nursing home operators.

Chronic Disease Hospital Program

The 1943 legislature authorized the construction of two chronic hospitals "for needy persons who require medical, nursing or custodial care by reason of chronic illness or infirmity." Two sites were to be selected by the State Board of Health, one on the eastern shore and one on the western shore. They were to be in urban areas where sewerage and water supplies were available and where there were the facilities of an accredited hospital.

The 1945 legislature acted favorably on the desire of Baltimore to be included in the plan and authorized a third hospital in Baltimore. The hospital in Baltimore has beds for approximately 500 patients; the other two are for 300 patients each. One hospital has been in full operation for some time. Construction is completed on the others, but because of problems of staffing they will not be operating at full capacity for another year or two.

The 1957 legislature revised the law which now reads: (Chronic hospitals are) ". . . for persons . . . who require constant medical and nursing care provided by a hospital by reason of chronic illness or infirmity, or who are suffering from a chronic disability amenable to rehabilitation." The law specifically excludes from the program patients with active tuberculosis or chronic mental disease. This rehabilitation service, because it is

unavailable to the community, is not limited to the low-income group but is available on medical indication to all persons at a cost not to exceed our cost.

With the development of the chronic disease hospital program, rehabilitation has become an increasingly important goal. The aim of rehabilitation is to assist the disabled in becoming as independent as possible. For some this means recovery to the point of complete independent self-care and perhaps even a return to gainful employment; others who acquire a high degree of independence in self-care can be returned to their homes since they no longer require nursing care; while others, less fortunate, may never acquire a significant degree of independent self-care, but can be taught many activities which simplify their care and lead to a more satisfactory life outside a hospital.

The principle of rehabilitation was clearly stated in the joint report of the chairmen of the Senate Finance Committee and the House Ways and Means Committee of the 1957 legislature as follows: "In approving these expenditures it is the hope of the committees that a constructive and economical service will be promoted by the intensification of the curative and rehabilitative aspect of the state chronic disease program."

Local Health Services

Considerable expansion and strengthening of local health departments is a crucial prerequisite to success in coordinated case management of any long-term patient who requires different levels of service at varying times. In all types of chronic illness or disability—whether it be the handicapped child, the mental patient, the tuberculous, or the patient with cancer, cardiovascular disease, or similar disabling conditions—there has been a notable shift in the roles of the hospital and community agencies during the past few years with a trend toward supporting and maintaining the patient in his home community.

"Our past thinking was all too often directed toward the construction of institutions to care, in an isolated environment, for specific medical problems—a mental hospital, a tuberculosis hospital, a chronic disease hospital. We failed to recognize that institution should be but one episode in the programmed care of hospital patients. Properly, the institution's outlook should be oriented for the eventual return of the patient to the community, and to his home. For this orientation to be successful, however, adequate community support services must be developed, so that the patient can be discharged from the hospital at the earliest possible time."

It is important to constantly remind ourselves that "public health" is not something which is the exclusive concern of the official local health agency. Public agencies such as local health departments and private health agencies should act as "catalysts" to promote a high degree of cooperative community action. For example, it is a responsibility of the local health agency to foster the meticulous synchronization of all health and medical services and facilities so vital in solving the complex problems of chronic disability.

As a step toward the needed integration of medical and hospital services around the individual patient at the local level, our department has been requiring submission by the local health departments of a rather detailed operational plan together with the proposed budget. This plan describes the health characteristics of the geographic area, the type and extent of current public health services, the current health problems, reasons for proposed changes or expansion, and plans for the future. To this has been added a series of "indexes of performance" that have been carefully selected by our Advisory Committee on Local Health Services. These indexes, which are reasonably available and modest in scope, have their limitations. However, they are a step in the right direction and we hope to improve them as experience

is gained. It is obvious that the simple imposition of plans and standards will not effect revolutionary changes overnight. Health programs closely reflect the people who run them, and by their very nature they cannot be better than the men and women who direct them. However, we believe that the systematic process of careful review by experienced program directors of local plans, budgets, and indexes of performance, supplemented by field visits, will facilitate more effective leadership by the state in weaving the various services and facilities into the whole fabric which we must have to deal effectively with chronic illness.

Conclusion

The various programs described are complementary, and services of different levels are provided so that when the patient's condition changes he can be moved from one facility to the other depending upon his needs. We have found that to accomplish this it has been advantageous to have all programs in a single agency.

In Maryland the average per diem cost in general hospitals is $26, and in some it is as high as $36. This figure is bound to increase due to a great variety of community forces, economic changes, and the application of modern medical practices. It has been predicted that costs will go to $40 or possibly $50 per day. The only solution to this problem at the moment is to make certain that high cost facilities are not used for a single day longer than is necessary. We should keep in mind constantly "never to use persons or facilities for purposes below the level for which they are trained or equipped." It is here that public health has a real challenge. In the development of facilities and services, public health should take leadership in cooperation with various government agencies, professional groups, and voluntary agencies.

Dr. Prather is director, Maryland State Department of Health, Baltimore, Md.

This paper was presented before a Joint Session of the Health Officers and Medical Care Sections of the American Public Health Association at the Eighty-Eighth Annual Meeting in San Francisco, Calif., November 1, 1960.

Agency Winners of Crumbine Awards

A jury of public health leaders chose the Philadelphia Department of Public Health for the 1961 Samuel J. Crumbine Award "for outstanding achievement in the development of a comprehensive program of environmental health." Eugene A. Gillis, M.D., is health commissioner. The Crumbine Award "for outstanding achievement in the development of a program of public food and drink sanitation" went to the District Health Department of Albuquerque, N. M., which at the time of award was headed by William A. Townsend, M.D. The annual competition for these awards is sponsored by the Public Health Committee of the Paper Cup and Container Institute.

The jury also awarded a certificate of merit to the Evansville-Vanderburgh County (Ind.) Department of Health for its program in food and drink sanitation, and to the Choctaw County (Okla.) Health Department for the thoroughness with which as a comparatively new department with limited resources, it has studied problems and mapped out needs and objectives.

The increasing significance of changing public policy in medical care is reflected in this analysis of developments in Philadelphia. Important is the emphasis on the need for continuing adjustment to change, and for the involvement of various sections of the community.

FORMULATION OF PUBLIC POLICY IN MEDICAL CARE: DYNAMICS OF COMMUNITY ACTION AT LOCAL LEVEL

Norman R. Ingraham, M.D., F.A.P.H.A.

THIS is the study of how one large urban community has struggled to develop public policy in medical care: how metropolitan Philadelphia, with its some 60 hospitals, more than 140 nursing and convalescent homes and homes for the aged, 300 qualified social agencies, eight city health centers and many public health clinics in the five-county area, and upwards of 5,000 practicing physicians, has endeavored to obtain some sense of direction for the medical care of its citizens. From a study of programs in other cities, it has been our experience that, in this field, there are many more common problems throughout the country than there are pat, or generally applicable, solutions. Nonetheless, broad public policy in any community must spring from individuals or small informed groups, and national policy, similarly, must stem from a synthesis of the individual opinions of its component parts.

Many major national issues, in particular those involving veterans' assistance and Social Security benefits in an aging population, however profound their subtle influence on medical care in all parts of the country, have had little place in the debate which has been waged to formulate local community policy in this field. This is so notwithstanding the fact that veterans and their dependents form one-fourth of the population; that the Veterans Administration has the largest hospital system under one management in the world; and that currently 70 per cent, and eventually more than 90 per cent, of persons in this country will be eligible for Social Security benefits.

Instead, local issues have evolved about the self-apparent symptoms, such as bed scarcity in certain categories (mental illness, chronic disease); deficiencies in the financing of hospitals; increasing inadequacy of the voluntary contribution to the care of the needy; inadvisability of medical care plant expansion in the community while percentage occupancy in some types of beds or in some institutions remains low; inadequacy, in part numerical, in part in quality, of nursing home bed-care facilities. The local discussions have seldom grappled with the underlying causes. In fact, many of these causes stem from social adjustments, such as wage and living standards, well outside the medical care field and often beyond the solution of any individual community.

The current formulation of public pol-

icy in medical care in Philadelphia and vicinity goes back to 1946, when a survey was made of hospitals in metropolitan Philadelphia by Ford, Bacon and Davis, Inc., with Dr. Basil C. MacLean as hospital and medical consultant. In the nine years that followed, up to 1955, there were five additional major surveys of various aspects of the medical care and hospital program: three by U. S. Public Health Service consultants; one by an independent consultant engineer for the Department of Public Health; and one by the Hospital Planning Agency of the Citizens' Conference on Hospital Capital Requirements in Philadelphia and Vicinity, in which projections were made for the period 1952-1960. This last "nonprofit, unincorporated agency of citizens" was really set up to implement the recommendations of the "Survey of Hospitals in Metropolitan Philadelphia, 1946."

It must be recognized that the collection of facts and the development of recommendations by experts is a far cry from the formulation of community policy. The earlier studies were more concerned with evaluating the need for hospital construction and with a consideration of whether expansion should be in the public domain or in the voluntary institutions, than they were with an over-all medical care program for the citizens. The scope of the studies shows these limitations and their frequency indicates that the community was endeavoring desperately to define the extent of the problem which confronted it currently and which was inevitably evolving. Each of the studies had the defect of being concerned with a single point in time. None had the benefit of a community-based continuing planning process in the health and hospital field.

Nonetheless, a few comments on some of the recommendations of the 1946 report are in order: First, to show that it was done with vision and imagination, with ability to foresee community needs; second, to show that needs unmet in 1946 were still largely unmet ten years later; and, finally, to emphasize that community policy is developed by action groups and not by studies and reports, however essential the latter may be in the initial development of sound public policy.

The 1946 survey stated that there was an urgent need for mental health facilities; there was an urgent need for institutions for the chronically ill; there was an urgent need for a comprehensive program to coordinate all phases of health and welfare. It was recommended that immediate steps be taken to establish uniformity of accounting and statistical methods in the hospitals. All of these are today still recognized, but largely unrealized, needs of the community in medical care. There was one halting step in the definition of community policy for the needy, which has been developed and elaborated over and over again in the years that followed these earlier studies. The citizens' sponsoring committee of the 1946 study stated: "Care for the ill and for those needing help outside of their own resources in periods of difficulty has tended to become more and more a community matter to be looked at and evaluated from the needs and welfare of the community at large." This circumstance is so obvious now, that it is hard to realize that it was forward looking then, when most thinking was centered about the requirements of an individual institution, a categorical disease problem, or a single patient or family relationship.

Any formulation of public policy for medical care of the needy must sharply focus sooner or later on the role of the public hospital. Philadelphia operates a public general hospital of about 2,000 beds, dating back more than 200 years. Much of the local debate, during this ten-year period, centered on whether care for the needy should be expanded and, if so, whether it should result in increas-

ing the number of public beds at one or more locations or whether it should be provided in subsidized already existing beds in voluntary hospitals. In its 1952 report, the Hospital Planning Agency of the Citizens' Conference on Hospital Capital Requirements in Philadelphia and Vicinity recommended that the voluntary hospital system be maintained, but that it take steps to quicken and stimulate better business practices in hospital administration, that it be required to avoid duplication of facilities and overbuilding of beds, and that it subordinate individual interests for the good of the whole community. These recommendations again were centered about the cost of construction and operation of facilities without a formulation of public policy for medical care.

Meanwhile, in 1954, the Board of Health of Philadelphia and the Board of Trustees of the Philadelphia General Hospital took an important step forward in clearly defining public policy for medical care in the public institution. These boards adopted jointly "Regulations Governing Requirements for Admission to the Philadelphia General Hospital." Interestingly enough, even though procedures had been loosely defined through past practice, and often controlled politically, there was no record of any recent formulation of public policy for admission to the public institution.

In addition to establishing medical need for hospital care and settlement in Philadelphia as necessary for admission, the regulations required that the individual to enter the Philadelphia General Hospital must be unable to obtain care elsewhere because of inability to pay, peculiarity of medical need, or for any other reason as defined by the executive director of the hospital. The exceptions to these admission requirements relating to emergency care, tuberculosis and communicable disease control, and mental illness did not detract from the basic provision of making available, in the public hospital, free care for those otherwise unable to obtain hospital care.

The next truly significant steps in the formulation of public policy in medical care in Philadelphia were the work of the Hospital Financing Study Committee, which reported in 1955, and the Philadelphia General Hospital Survey, completed in 1956. The Hospital Financing Study Committee was appointed jointly by the Health and Welfare Council, the Associated Hospital Service, the Hospital Council, the Community Chest, and the United Fund, and was very broadly representative, including nominees from the voluntary agencies, organized labor, Catholic, Protestant, and Jewish charities, and the Chamber of Commerce, as well as organized medicine. State and local public agencies in health and welfare and the City Planning Commission were represented, though very much in the minority. The Philadelphia General Hospital Survey was a detailed factual community study in the medical care field, conducted by a group of professionals, supervised by an advisory committee of health and hospital experts, financed by capital program funds of the city of Philadelphia to the extent of some $40,000. This study included not only an appraisal of public facilities, but also of community program trends and needs in medical and psychiatric care, tuberculosis care and chronic illness, including nursing and convalescent homes and homes for the aged.

The Hospital Financing Study Committee clearly recommended several sound principles on the policy of payment for "free service" in hospitals, but it did not relate these to any over-all community program for medical care. The basic public policy statement of this committee was that: "Responsibility for hospital treatment of injured and ill persons requiring short-term treatment (inpatient and outpatient) who are financially unable to pay therefor, should be

assumed by the public, and the operating cost thereof paid out of tax-collected funds." Additional principles were enunciated and bases for their formulation were given as follows:

1. The city government should assume responsibility for developing the medical care program for the needy.

2. State funds going into the program should be administered by the city.

3. To the extent that the city is unable to furnish such services in existing facilities operated by it, the city should purchase the required service from voluntary hospitals on a contractual basis.

It was pointed out that, as a matter of public policy, the trend toward increased payment for such "free services" from tax-collected funds has been established. In 1937, "free services" rendered in short-term hospitals in Philadelphia were equally divided between tax-collected funds and philanthropy. By 1953, the ratio of tax-dollar funds to private philanthropy had increased to 69:31, and in 1958 to 80:20. This trend has been even more marked on a national basis, having reached a ratio of 81:19 by 1953. This was the first local study in which time comparisons in costs were related to responsibility for payment for care and where national trends were seriously considered to guide local policy.

On the other issue, contractual service by the public agency with voluntary institutions, the policy statement of the Hospital Financing Study Committee followed that of the American Hospital Association and the American Public Welfare Association on hospital care for the needy made as early as 1939, which stated the principles that: "Voluntary hospitals should be paid by the appropriate public authority for care of persons for whom the public had assumed responsibility. The payment should be in proportion to the service rendered, not as a lump sum, and should be based on a reasonable 'cost.' "

Even though the policy recommendations of the Hospital Financing Study Committee were not related to over-all community medical care programs, but rather to fund raising and to the problem of increasing costs of hospital care, they nonetheless have proved to be sound in principle when related in subsequent formulations of policy to such programs.

The Philadelphia General Hospital Survey (1956) formed a principal part of the background material used by the Policy Committee on Medical Care for the Needy to the Mayor and City Council in a later development of community policy completed in February, 1957. Some of the important facts gleaned from the report of the Philadelphia General Hospital Survey were:

1. In the 20 years prior to 1954, in Philadelphia, beds in the municipal hospital declined from one-fourth to 18 per cent of the community total. By 1958, this figure continued to decline dramatically, partly as a result of policy decisions which I shall subsequently discuss, to about 8 per cent (1,808 municipal hospital beds among 21,899 beds for the community as a whole). From 1931 to 1954, patient days at the municipal hospital decreased 10 per cent and number of admissions remained relatively unchanged. Among voluntary hospitals, on the other hand, patient days increased 20 per cent and admissions rose 64 per cent. This proportionate decline in the role of the municipal hospital has resulted from an increase in the facilities and services of the voluntary hospitals.

2. The volume of total inpatient service provided to the indigent and medically indigent in Philadelphia has been declining, both as a proportion of total service and in actual amount. This has been largely due to an upgrading of many voluntary hospital patients from ward to semiprivate status, resulting from the growth of Blue Cross, Blue Shield, and other types of prepaid medical and hospital insurance, and from the growing acceptance of members of the community of personal responsibility for medical care.

3. The chronic illness problem in Philadelphia is a staggering one, involving approximately 65,000 persons disabled for more than one month in any one year. The impact of the aged, even on acute illness, can be realized from the Philadelphia General Hospital figures, which showed (in 1954) more than one-fifth

of the short-term medical discharges were over 65 years of age. The care of the chronically ill is inseparable from general medical care and should not be medically isolated. The basic recommendations on public policy in medical care in Philadelphia in this report reiterated those of the Hospital Financing Study Committee and were elaborated upon in the report of the Policy Committee on Medical Care for the Needy to follow.

The Policy Committee on Medical Care for the Needy* included members of the medical profession; other persons long experienced in the health and hospital field; leaders of union labor, business, and finance; four leaders of the city government, including the president of City Council and the managing director. The committee attempted to determine Philadelphia's proper role in medical care for the needy as its sole assignment.

The concept of medical care used by this committee was very broad, and, for the first time, we see policy evolving about a community program for medical care, rather than about a concern for hospital financing which, however important in itself, is only one segment of this picture. Medical care, as used by this committee, included preventive care, care for the mentally ill and tuberculous, care for the chronically ill and the acutely ill, and rehabilitation. Considerations were not limited to medical care in hospitals' inpatient and outpatient departments, but embraced, as well, home care, care supplied at health centers, and by physicians and nurses, individually, or their qualified assistants. One limiting factor was the restriction of the program to needy persons. The needy were classified as those receiving welfare payments or those who, because of their economic status, cannot adequately supply necessary medical care for themselves. The committee envisioned the definition of the "medically needy" as being the responsibility of the public agency, based on the type and extent of care necessary, the size of the family, and the degree of financial inability.

The obligations of the city are clearly set forth in this expression of public policy:

1. "Promotion of public health and the prevention of disease are primary duties of every civilized community . . . for the benefit of all persons who live and work there."

2. Care of needy persons acutely ill is a joint responsibility for which part of the financial cost should be borne by the city, part by private contributions, and part by the state and federal governments.

a. Emergency care of needy persons should be borne by the city through "contract with certain voluntary hospitals suitable from the standpoint of facilities and location."

b. Care of contagious illness of needy persons "must be a prime responsibility of the City."

3. Care of the chronically ill among the needy is so similar to the care of the acutely ill as to warrant no distinction, except that more home care is often possible for chronic disease.

a. The committee endorsed the present system, which provides that long-term care of the mentally ill be supplied by the state, but that short-term care of the mentally ill be supplied by the city.

b. In the long run, the hospital care of tuberculosis, now jointly provided by city and state, should be taken over by the state. The inference, elsewhere in the report, apparently is that ambulatory care of tuberculosis should remain a joint responsibility of the city and state.

c. While the policy determination with respect to the responsibility for rehabilitation among the needy is less precise, "the return of a person disabled by accident or disease to

* The Policy Committee on Medical Care for the Needy was appointed by the mayor with the concurrence of the president of City Council, June 13, 1956. The members of the committee were all prominent leaders of the community, were selected without regard to political affiliation, and were asked to serve as individuals not as representatives of any group or agency. Many, of course, held key posts in the community which could have affected acceptance of their decisions.

his greatest physical, mental, emotional, social, vocational and economic usefulness" is recognized to be of great importance and a field in which the "City should expand its efforts."

4. The principle of complete utilization of existing community resources with proper distribution of the financial obligation stressed by the Hospital Financing Study Committee was reiterated and further developed in this report:

a. "The City should use its existing efficient facilities to provide medical care for the needy. Insofar as these City facilities cannot sufficiently meet the needs, contracts with voluntary facilities should be negotiated or appropriations made to the voluntary hospital on some other basis."

b. "All such contracts should be negotiated, using as a guide the actual cost to the voluntary organization of rendering the service and the actual cost of rendering the service in city-owned and operated facilities and the actual cost of rendering similar services in the most efficient voluntary organizations."

c. "Everything should also be done to support the activities of the Associated Hospital Service, Blue Shield, local medical centers and other activities by which people group together, through insurance or otherwise, to provide for themselves high quality care at minimum cost. Were it not for these organizations, the burden of medical care which would fall on the taxpayer or on many individuals of average income would be insupportable. The city might well explore ways and means (municipal, state and federal) of subsidizing Blue Cross and other medical or health plan coverage of the needy."

In short, as paraphrased from the first sentence of its conclusion: The report presents to Philadelphia, for the first time in recent years, the over-all basic policy decisions from which to develop a coordinated program for the Department of Public Health in the field of medical care for the needy. Yet, it must be recognized that policy determinations solely based on medical care of the needy, while vital to a definition of public responsibility, still constitute only a small portion of the backdrop for an over-all medical care program in any community.

Rising costs, rapid advances in medical technology and treatment, increased public enlightenment about medical care services make devices to keep abreast of public policy in this field imperative. This is a situation where a single static study is of limited value. Continued fact finding, establishment of local trends, and repeated review of local program are essential if community efforts are not to lag far behind the popular demand and the actual needs.

A year after the Report of the Policy Committee on Medical Care for the Needy, a Special Committee on Hospital Support of the Board of Directors of the Community Chest made, as its primary recommendation: "The formation of a strong and properly representative community organization in the hospital field whose objective will be to promote the public interest." In fact, the Policy Committee on Medical Care for the Needy recommended that the "City take the initiative in establishing a Philadelphia hospital advisory planning board." This had not evolved after more than a year. Such a committee was appointed, however, in December, 1958, jointly by the mayor, the president of City Council, the president of the United Fund, and the president of the Health and Welfare Council, with the title, "Community Policy Committee on Health and Hospital Services."

This committee consists of 24 members: eight from the fields of business and finance, one from labor, and four prominent citizens noted for their work in the health and welfare fields. There were six with professional interests in the health and hospital field; five from the field of public service, including the president and chairman of the Public Health Committee of City Council, the managing director, the commissioner of health of Philadelphia, and a representative of the state legislature. This committee, presently financed by the United Fund through the Health and Welfare

Council, with a small contribution in service from the city, is staffed by a full-time administrator trained in the health and hospital field, and a Professional Advisory Group, consisting of career executives from the Hospital Council, United Fund, Philadelphia County Medical Society, City Council, Health and Welfare Council, Greater Philadelphia Movement, the Department of Public Health of Philadelphia, Philadelphia General Hospital, and the Bureau of Municipal Research.

Once the public position on medical care for the needy had been established on a broad community base, the varying responsibilities, public and private, local, state, and national have begun to clarify, each as a component part of the whole. Rather than masses of data and individual partisan opinion without a sense of direction, the local issues have become sufficiently evident to make possible local political action and a strong expression of local opinion at higher levels of government, when there have been programs of mutual concern in the medical care field.

Local action has resulted in a decrease in beds in the public hospital by some 20 per cent and a corresponding expansion of contractual service by the city with voluntary hospitals for prenatal, postnatal, maternity care of the needy, and for tuberculosis care, costing more than $1 million per annum of city funds. The development of a public program for support of emergency care of the needy in the voluntary hospitals by the Department of Public Health has been accepted by the city administration and is awaiting only tax-dollar support.

The relationship between state tax-dollar support and local tax-dollar support of local medical care programs is also an important issue in most large cities. The clear development of local public policy has made possible forceful and effective presentation of local medical care needs at state level.

An excellent example of the way in which formulation of local policy on medical care makes possible participation in the development of national policy comes from the statement of the commissioner of health of Philadelphia in behalf of 58 hospitals in metropolitan Philadelphia, at the public hearings on the Forand Bill (H.R. 4700) held in July, 1959. The reason for local interest in this national problem becomes apparent when it is realized that there are approximately 250,000 individuals in southeast Pennsylvania currently receiving Social Security payments.

The testimony pointed out that during the 1958-1959 hospital fiscal year, one-third of the cost of medical care provided to the needy represented care rendered to persons on Social Security who were unable to pay for medical care. In round figures, this represents one-third of a million patient days at an average ward cost of $20 or $6.7 million. Of this medical care bill for Social Security clients, about 49 per cent was paid for last year by the city, 21 per cent by the state, 7 per cent by the United Fund, and the remaining 23 per cent by internal resources of the individual hospitals.

The increase in voluntary health insurance coverage for persons 65 and over has been phenomenal in recent years. In 1952, only about one-fourth of the 12.7 million persons in this age group had any type of health insurance. By 1959, voluntary insurance coverage had risen to 40 per cent, while this age group was increasing to 15.3 million. It is estimated that voluntary insurance of those aged 65 and over may reach 56 per cent by 1965, and 68 per cent by 1970. By contrast, currently, 70 per cent of all persons aged 65 and over are now eligible for benefits under the Old Age, Survivors and Disability Insurance Program; and eventually, more than nine out of ten will be eligible.

This is, of course, not a local problem and is the real reason why joint formulation of medical care policy, local, state, and national, is necessary for its solution. Not only is the problem of hospital care for older people being inadequately met on a national basis, but further, the extent of the problem, both in terms of numbers to be served and costs of necessary services is rapidly increasing.

One of the strongest appeals to local governments and taxpayers of federal hospital insurance to those on Social Security is that it would tend to keep down the contribution to public assistance and hospital care from the state and local tax dollar.

With the development of a local public policy on medical care, some of the stakes of the local government in the state and national issues have become clearer and the solutions more evident on a program basis, rather than from equity alone. Instead of entering pleas for funds for medical care on the basis of receiving a fair share of the tax dollar, always a very weak argument before any legislature, program elements have been defined which can be jointly sponsored by local, state and federal administrators and which, if need be, can be reduced to planks in a political platform when issues become strong enough to warrant this.

Metropolitan Philadelphia, in common with many localities, has had difficulty in defining its place in the changing medical care field over the past ten or 15 years. Deficit financing of hospitals and threats at the very standards of medical care and of medical education in the teaching hospitals, in which Philadelphia has had a proud tradition, have been necessary to force upon it the realization of a need to clearly define its own position.

Particularly difficult to grasp has been the realization that medical care is not a simple, static problem to be solved by a single survey, by calling into consultation a medical care expert, by setting up another citizens' fact-finding committee. Medical care concerns the physical well-being, the very comfort and life expectancy of large segments of the population, among whom the most certain element in their way of life is need for adjustment to change. This challenge cannot be met by a single policy determination but must envision a process of continuing fact-finding and policy adjustment.

The most important new ingredient in the Philadelphia picture is not that policy determinations have been made about programs for medical care of the needy, which are being followed through, but that there has been a realization of the necessity for evolving a structure for continuing community policy formulation in health and medical care. The final organization, and, in particular, the method of staffing this effort on a continuing basis, has not been reached. Yet, there has developed a deep conviction in the power structure of the community that progress, not to say survival of any competent medical care program with high standards, will depend upon a vigorous and unrelenting attack upon the facts and a continuous informed citizens' review of public policy.

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This paper was presented before the Medical Care Section of the Pennsylvania Public Health Association, Eighth Annual Health Conference, Pennsylvania State University, University Park, Pa., on August 19, 1959.

The relations between community mental health programs and state mental hospitals are beset with problems that require solution. The author discusses the nature of these problems and some ways of dealing with them.

PROBLEMS IN RELATING COMMUNITY PROGRAMS TO STATE HOSPITALS

Hyman M. Forstenzer, M.S., F.A.P.H.A.

NEW YORK STATE's Community Mental Health Services Act, and most other state-wide efforts to develop mental health services at the community level, came into being largely as a result of frustrations caused by an almost complete reliance on state mental hospitals to cope with the problems of mental illness. After more than four years of experience in the administration of the New York State community program, I see more clearly than ever the pertinence of the following comment by Sir Geoffrey Vickers in an address on "What Sets the Goals of Public Health." "In 1946," Vickers said, "the British Parliament, with the passing of the National Assistance Act, thought it had destroyed the last vestiges of that 'New Poor Law' which the reformers of 1834 expected to abolish destitution. Yet every page of the new statute reflects attitudes which are not responses to the future but protests against the past. It is not only soldiers who start each war perfectly equipped to win the one before."[1]

Are our present efforts to develop community mental health programs more a protest against the state hospitals of the past than an attempt to meet the present and future needs of the mentally ill? I believe that our most important and most immediate need is to develop a working partnership between community services and facilities and the state hospital systems. Unless this is accomplished, I fear that we run the risk of solidifying two separate and distinct programs, both operating at less than optimal levels, each handicapping the other, and each presumably concerned with different portions of the range of mental illnesses and possibly with different segments of the total population. An adequate system for the control of mental illness in populations cannot be developed with the present dichotomy of community and state hospital services.

It is not necessary here to document the obvious advantages of community based services and facilities, or the present huge quantitative deficit of such services, or the widening gap between professional manpower and our increasing population. Suffice it to say that there is consensus on the need for more community mental health services and on the probable shortage of professional personnel to meet present and future needs if existing patterns of providing services are maintained. There is no agreement, and indeed in some quarters not even cognizance, that there are

weaknesses and dangers in the separate and qualitatively unchanged growth of community mental health services. Opinions range all the way from eliminating state hospitals and replacing them with community services to statements that state hospitals deal with mental illness and community programs with mental health.

The position I take, and it is implicit in the title of the paper, is that in the present period and for the foreseeable future the control of mental illness can be approached best through an effective relationship between community services and state hospitals. The problems in relating community programs to state hospitals derive from attitudes, from legal and administrative restrictions, and from long-standing organizational patterns which are present in both the hospital system and in community programs. A major portion of the change process must be initiated, in my opinion, at the community level. Changes are occurring faster in state hospitals than in community services. The overuse and misuse of state hospitals in the past because of the lack of alternative facilities and services is universally recognized. However, community facilities in the main are unwilling to consider themselves as alternatives to hospitalization.

One group of problems stems from community attitudes toward reassimilation and rehabilitation of released patients in the community. At a meeting of State Mental Health Authorities held on March 13, 1959, Dr. Robert Felix, director of the National Institute of Mental Health, reported that the number of patients resident in mental hospitals decreased by 15,980 from January 1, 1956, to December 31, 1958. Data collected by the Institute reveal that if the 1945-1955 trend in state hospital populations is projected, the actual resident population on January 1, 1959 was 52,000 less than the projection. This decrease takes on greater significance when our national population growth is considered. It is even more striking because state hospital admission rates continue to rise. In New York State, admissions during the month of February, 1959, to state mental hospitals numbered 1,994, setting a new high for admissions in the month of February. This is the 11th consecutive month in which the number of admissions has set a new high record for the particular month. In the first 11 months of this state fiscal year there were 22,738 admissions, as compared to 21,006 for the same period last year, an increase of almost 10 per cent. Despite this, the resident population dropped over 1,600 in 11 months by virtue of a substantial rise in the "alive" release rate.[2]

Community programs have shown little willingness to accept responsibility for the released state hospital patient. There has been in the last four years a fantastic increase in the number of people living in communities who have been identified as seriously mentally ill. Yet there is an almost complete vacuum of services for patients leaving the hospitals. On a national basis the hospital readmission rate is rising. It is true that this rise is in part a statistical artifact. The number of voluntary admissions is constantly rising and in New York now equals approximately one-third of all admissions. However, in New York and other states, voluntary admissions are discharged and not placed on convalescent leave. Thus, the return of such patients to hospital constitutes a readmission whereas the return to hospital of a patient from convalescent leave is not recorded as a readmission. Despite this artifact, there are strong reasons for believing that readmissions will increase in the absence of supporting programs in the communities. A "swinging door" policy for state hospitals seems to work well in some British hospital districts, but it is part of a system of care in which

the same staff serves the hospital and the community, and admission procedures are less encumbered with legal restrictions.[3]

The problem of the released hospital patient must be approached from the hospital side as well. It has only been in the last year that legal questions were clarified in New York State so that hospital directors are now able to release voluntary patients on convalescent status, where indicated, instead of being limited to outright discharges. It is difficult to see how the state hospital convalescent care system, in the relatively few states which have such a system, can keep pace with the tremendous increase in hospital releases.

A number of states have been working toward the use of public health nurses and public welfare case workers in aftercare programs. State vocational rehabilitation programs have also been moving in the direction of extending their services toward released hospital patients. However, no comparable move is being made by community based psychiatric services and facilities. A way needs to be found which will preserve the values in a continuing relationship between hospital and patient and also provide for utilization of community resources for the benefit of hospital patients returning to the community.

Another group of problems centers around hospital admissions. Mental health specialists serving in communities will state categorically that inpatient and outpatient treatment are parts of the same clinical course. In practice, however, they do not behave that way. They affirm that hospitalization is a part of treatment and not necessarily a failure in treatment; but in the same breath they insist that outpatient clinics which allow themselves to become involved in the process of hospitalizing patients will lose their patients and their community support.

The resistance of community mental health services personnel to becoming involved with hospitalization is evidenced by our current experience in New York State. At the request of the full-time health officers of our state, the Department of Mental Hygiene is sponsoring legislation to grant to local directors of mental health services the same powers and duties in connection with emergency certifications as are now exercised by the local health officers. Many of our local mental health directors oppose the proposed legislation. The reason most frequently given, at least initially, is that this would add to an already intolerable work load. Discussion reveals the real reason to be sharp reluctance to involvement in hospitalization. The low opinion of state hospitals and the hostility toward them is almost invariably attributed to the clinic's patients; rarely, if ever, does the clinic staff admit such feelings on their own part, except by their actions.

On the hospital side, this cluster of problems stems mostly from archaic laws. In New York and in many other states, state hospital personnel are legally excluded from the decision making process in connection with hospitalization. By training and experience, hospital personnel are best equipped for work with psychotic patients, but by law they may not participate in deciding whether the patient will benefit most from hospitalization or from an alternative method of treatment in the community. The legal restrictions constitute a major deterrent to the effective use of hospital personnel in a consultative role to community agencies and to the psychiatric staff in community agencies. The latter lose a valuable opportunity to familiarize themselves with the problems of psychotic patients. Frequently, the legal barrier against hospital staff involvement in the process of obtaining hospital care serves as an excuse for not encouraging and even for prohibiting the joint use of personnel

by hospital and community services. It is significant that the Mental Health Bill recently enacted by the British Parliament specifically provides for the participation of mental hospital staff in the admission procedures.[4]

It is difficult to document the lack of relationship between community clinics and mental hospitals in the absence of sustained and consistent data collection from community clinics. The National Institute of Mental Health has been providing outstanding leadership in trying to develop a nation-wide reporting system for outpatient clinics. New York State last year instituted a required system of reporting which includes an individual report on each terminated case. Of 22,078 reported terminations in the period from April 1, to September 30, 1958, only 338, or 1.5 per cent, had been referred to the clinics from psychiatric hospitals and only 486, or 2.2 per cent, were terminated with referral to public mental hospitals. Only 1,844, or 8.4 per cent, had had previous psychiatric treatment in an inpatient facility (including general hospitals) within three years of admission.[5] The California State Department of Mental Hygiene for the year ended June 30, 1954, reported that of 3,672 clinic cases 70 were referred from state hospitals or clinics and 187 from the State Department of Mental Hygiene.[6] All 194 clinics in New York State except four recently organized are now participating in the state-wide clinic reporting system. A year from now we will have a clearer picture of the relationship between community clinics and state hospitals in New York State.

Right now, one wonders how the "Closed Ranks"[7] of communities toward the seriously ill can be broken in the absence of leadership by example on the part of the community specialists in mental illness. Close observation of the practices of outpatient community services over a full decade forces the conclusion that as far as the seriously mentally ill are concerned the ranks of community service personnel are almost as closed as are those of the total community. This may be the result of differences in values or in role concept, of economics, or of training. Whatever the cause, it is important to note that community mental health specialists by and large play no role in the care and rehabilitation of the seriously ill in their communities. The original rationale for mental hygiene clinics, namely, to prevent psychosis by treating nonpsychotic psychiatric cases still seems to govern clinic practice although it has never been validated and most clinicians have quite properly stopped using it as a justification for support of clinics.

The relationship between community inpatient facilities and the state hospitals presents another set of problems. First, there is the still strong resistance of general hospital boards and staff to the development of psychiatric services within the general hospital. Second, there is the preoccupation of the large, municipally operated, general hospital psychiatric divisions with screening patients to determine whether treatment is necessary. Here the prevailing pattern of distribution of fiscal responsibility for the hospital care of the mentally ill plays a significant part. In most states, mental hospitals are entirely supported by state government with no charge back to local government. Local fiscal authorities exert pressures on local mental health specialists in publicly supported general hospitals to quickly arrange state hospital admission for those for whom treatment is considered necessary and to discharge the others back to the community. The determination is rarely made on the basis of what can be done for the patient through short-term treatment programs within the general hospital.

In New York State, the Department

of Mental Hygiene and the New York City Community Mental Health Board are expending considerable time and effort on this problem in connection with the large municipal hospitals in New York City. To help these hospitals obtain space and time to treat those for whom short-term treatment is indicated, voluntary commitments are being encouraged as is the use of certification by one physician upon petition of a responsible relative. The purpose here is to eliminate delays caused by the piling up of patients awaiting judicial certification. In one large municipal hospital, through these efforts, it was possible in the period from July through September, 1958, to use physicians' certificates instead of court certification for 65 per cent of the patients who were sent on to a state hospital. An increase in the short-term treatment program was made possible, considerable duplication in initial work-up avoided, and patients were able to get into a treatment program without prolonged delay.

This problem is far from solved. Resistance is still being met, especially from the courts and from the legal profession. The State Legislature in New York is considering a bill sponsored by the Department of Mental Hygiene to authorize the general use throughout the state of certification by two physicians on petition of a responsible relative. Opposition, mostly from the courts, has resulted in an amendment to the bill so that one of the two physicians must be a qualified psychiatrist. The usefulness of the procedure in rural areas is thus considerably reduced.

On a different and more hopeful level, there are problems in delineating the role of the general hospital psychiatric division in relation to the state hospitals. California's Short-Doyle Act limits state aid for inpatient care in a general hospital to 60 days. New York State's Community Mental Health Services Act contains no limitation. However, the Commissioner's Regulations Governing State Aid are being amended to provide a 90-day state aid limitation except for teaching hospitals and children's units. Local mental health boards, however, may request extensions beyond the 90-day period when recommended by the clinical director of a service. If a line needs to be drawn between state hospital and general hospital care it should obviously be drawn on the basis of the best interests of those who need treatment. It is not likely that this will be done as long as most states have the present system of total state responsibility for mental hospital costs.

The extension of state-wide statistical reporting to general hospitals, a serious gap in data collection, should provide many useful clues for effective relationships with state hospitals. Optimal location of day and night hospital programs, in communities which have a choice between state and general hospitals, should be determined through field evaluations. Administrative and legal barriers to dual appointments and to joint use of facilities constitute a major problem and should be eliminated. New York's Community Mental Health Services Act expressly permits the employment of state hospital staff by community mental health boards, but other laws and administrative regulations create obstacles to such employment.

Improved districting of state hospitals would facilitate closer relations with community programs. Plans are being developed in New York to evaluate the assignment of specific state hospital wards or buildings to patients from a specified health district or community. Inclusion of state hospital personnel in community mental health boards should be encouraged. I deeply regret that a provision for regional councils composed of state hospital directors and community services directors was dropped from the original draft of New York's Community Mental Health Services Act.

Some of the problems in relating community programs to state hospitals have been described. There are many others, but none of them are insoluble. Until they are solved, it is unlikely that we will develop an effective program for the control of mental disorders in large populations.

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This paper was presented before a Joint Symposium of the American Orthopsychiatric Association and the Mental Health Section of the American Public Health Association at the Annual Meeting of the American Orthopsychiatric Association in San Francisco, Calif., March 30, 1959.

Research Grants in Radiological Health

In view of the rapid expansion which is forecast in the use of nuclear energy, x-rays, and other sources of radiation, a greatly expanded program for research grants in the field of radiological health has been developed by the Public Health Service. These grants are offered to support research by individuals, universities, hospitals, laboratories, and other public or private institutions in the assessment and control of man-made and natural radiation exposures to the individual, no matter how the separate components may originate.

Research proposals should contribute to the determination of the extent and character of the radiation problem as well as the mechanisms by which radiation produces damage. Studies aimed at the elucidation of the radiation damage "cause and effect" relationship, basic investigations relating to critical body organs and systems, broad epidemiological studies directed at a scientific evaluation of long-term effects, field studies of the movement of radioactive contaminants in biota and human food chains, purely physical studies, such as chemical mechanisms in radiation chemistry, and those aimed at directing scientific findings toward control devices or procedures are among the kinds of studies encouraged.

Further information from Dr. Paul F. Hahn, Chief, Office of Extramural Grants, Division of Radiological Health, U. S. Public Health Service, Washington 25, D. C.

The voluntary hospital system in the United States is undergoing a change which in the next decades will turn it into a very different system. For this reason it is necessary to examine problem areas to see how best to plan for the future. This important topic is considered in the paper presented below.

REVITALIZING HOSPITAL PLANNING

Gordon R. Cumming, M.A.

IN THE United States today, there is active pressure to make significant changes in the voluntary hospital system. This pressure reflects a heightened public interest in health care and a public recognition of its importance. Rapid medical advances have created scientific and technical competence to provide health services which we have not learned how to organize and manage to our own fullest benefit.

Very often, people in public health, medical practice, and hospital administration are distressed by the criticism the public expresses of medical care and its control. The comment is made that people simply do not understand health problems nor have reasonable appreciation for the complexities involved in making health services available to the public. It may be that the public is not sufficiently appreciative of the many good things it enjoys from modern medical and health care. I believe, however, that the current interest in health care constitutes a solid public recognition of its high quality. I believe further that the public considers health services to be of such major importance that they should not be entrusted to the exclusive control of physicians, hospitals, and people in public health.

Since public attention is focused at times very dramatically on health services through inquiries into quality and cost, we need to examine problem areas to see whether we are doing reasonably well and should seek improvement on a basis of modest evolutionary change or whether we are doing very badly and should seek to develop some new system of health care.

Here in California, we have had the opportunity of observing the voluntary system at work in a most difficult environment. Our population has increased from 7,000,000 in 1940 to more than 15,000,000 today, with the prospect it will exceed 25,000,000 in 1975. Building and using the hospitals to serve this public involve a staggering capital investment and public operating support. About one-half of all the hospital facilities we now have in California have been developed since World War II. Involved in this development has been the dedicated effort of religious groups and other nonprofit organizations, of private investment, and of government.

It is not surprising that the essentially uncoordinated effort of the hundreds of independent organizations involved in this expansion has created problems. The institutions which have been created have expanded the hospital bed capacity at approximately the same rate as the state's population growth, but these beds and the institutions in which they are located at times have not met community needs effectively because of the type, size, and location of individual hospitals. Lack of coordinated development has produced duplication of expensive services, gaps in essential services, duplication of facilities, competition, inappropriate use, overbuilding in some areas and underbuilding in others. General hospitals often have been inappropriately located in relation to each other and of inappropriate size to meet community needs effectively. Relationship between general hospitals and other specialized health facilities such as nursing homes and mental hospitals often has been inadequately developed to provide effective patient care which has continuity. Community hospitals often have been unable or unwilling to shoulder a community responsibility for rehabilitation programs, psychiatric programs, and chronic disease programs. Organized community programs whose purpose is to substitute home care for use of hospital beds are almost nonexistent.

In 1947, the National Commission on Hospital Care observed: "The haphazard development of hospital service of the past should not be extended to the future. . . . If the professions and the public fail to take full advantage of their opportunity to realign hospital care to match needs and demands of the public, they will contribute to the bankruptcy of voluntary effort in the hospital field. Intelligent planning now will provide hospitals with an opportunity for future growth—growth in effectiveness, service and public appreciation."

With full recognition of the achievements which have occurred in California, we must recognize that the challenge presented by the National Commission on Hospital Care has not been met effectively anywhere in the United States.

In several states, including New York, Michigan, and California, extensive studies are being made of health services, including those provided in institutions. An extensive report on New York titled "Prepayment for Hospital Care in New York State" has been published. It contains extensive recommendations for coordinated planning and use of hospitals. Somewhat similar reports soon will be available in California and Michigan.

During 1959, the American Hospital Association and the Public Health Service sponsored four regional conferences which are reported in publication No. 721 titled "Principles for Planning the Future Hospital System." The central theme of the regional conferences was planning tomorrow's hospital. From the four conferences, 16 section reports were prepared, all of which emphasize the urgent need for better coordination in the planning and use of hospitals and related health facilities. Following the four regional conferences, the American Hospital Association and Public Health Service jointly appointed a small committee, under chairmanship of George Bugbee, to develop in briefer form a statement of concepts to guide the future development of hospitals in the United States. Within the next few months, it is anticipated this committee will issue a report which should be of major importance in guiding the future development of hospital services in this country.

In all the recent studies of hospital service, there are certain common characteristics which justify comment:

1. There appears to be general agreement that real pressure exists to develop improvements in hospital planning in the interest of higher quality and greater efficiency.

2. There appears to be recognized need for developing better information and more effective ways of analyzing it.

3. There is recognition that the professions, voluntary agencies, and government are actively involved. The issue is not whether leadership and control of hospital planning and services should be through voluntary or governmental processes. The issue is on the relative emphasis which should be placed on the voluntary role and governmental role.

4. There is common recognition that both state-wide and local viewpoints need to be reflected in planning, leadership, and control.

It appears to me the issue we face is that of developing a method to mobilize the interest and force of the public, the health professions, hospitals, other voluntary agencies, and government in a manner which will produce the most effective public service. Since complex and sensitive relationships are involved, it is probable the solution will vary in different states, depending on the traditions and relationships which are part of the regional environment. I would like to suggest, however, that, regardless of the particular mechanism which is developed, some primary concepts need to be kept in mind:

1. Hospitals and related health institutions now are a vital component of medical care. Without the organization, personnel, equipment, and buildings which the institution provides, modern medical practice would be impossible. As medical science continues to advance, the role of the hospital will become more important. In contrast with the past when a hospital was a loosely organized workshop for the physician, the community hospital today has a responsibility to function as a center for comprehensive health care in the community. One of the hospital's missions should be to extend its responsibilities beyond its walls into the community through programs for those who are not occupying beds.

Relationship between doctors and hospitals needs clarification. In theory, this relationship is very clear. The doctor practices medicine; the hospital provides institutional services. In practice this relationship is not so clear. The hospital establishes many controls and checks on medical practice in hospitals by establishing standards for staff membership, staff performance, and related elements of organized practice within the institution. A hospital also has basic legal responsibility from a liability and malpractice standpoint.

2. The public nature of service provided by hospitals needs to be recognized. This recognition means that hospitals should be considered to have a primary responsibility for providing community service, with business and financial aspects of their operation being secondary. The most articulate statement of this issue of which I have knowledge is its discussion by Francis R. Smith, insurance commissioner of the state of Pennsylvania. In talking with the hospital bureau of New York City, March 3, 1960, he said: "The difference between your work and ordinary business is that private business, the strength of our nation, is based on private capital. It is in the big game of business to win, lose, but seldom to draw. Its rules are rough. Hospitals cannot play under these rules nor would the public permit them to do so. Hospital business is big, yes, but it is also public business and it grows more public every day. The competitive standards of business can never properly apply to hospitals. The greater reality which surrounds hospitals in their daily work—the lives and deaths of men, women and children—are not the concern of business. Certainly hospitals must see that they are run effectively and efficiently, but their prime purpose is restoration to health of the sick under the direction of the doctors and nurses who make this possible."

3. It is important in thinking about the voluntary hospital system to recognize that hospitals and other health facilities are not components of a highly organized system which functions under central control and direction. Many types of hospitals and many forms of sponsorship are involved. One important factor which needs to be kept in mind is that the general hospital is the key institution in the organization of hospitals and related health facilities. The general hospital is the point of most frequent public contact. In California, more than 95 per cent of all hospital admissions are made to general hospitals, in comparison with less than one-half of 1 per cent to tuberculosis hospitals, approximately 2½ per cent to mental hospitals, and approximately 1½ per cent to nursing homes and other long-term care facilities. Since the general hospital treats the vast majority of patients and serves as the avenue of admission for almost 100 per cent of all patients admitted to institutions, its central co-

ordinating role under effective community planning cannot be overemphasized.

4. Gaining the most effective and appropriate use from all health resources begins with planning. This planning needs to reflect local, regional, and state-wide viewpoints and to be participated in by voluntary groups and official agencies. Some of the specific issues which need to be met in this planning include:

a. Establishment of long-range planning objectives for all regions in each state. This should include projecting population growth.

b. Defining the characteristics of hospitals which are planned in each community in terms of their size, number, location, and mission.

c. Planning objectives should include at least three levels of planning for: (1) community hospital service; (2) specialized service within large geographical regions; and (3) provision of medical and related education.

If gaining more effective and appropriate use of hospitals and related health facilities depends, as many national authorities believe, on more effective and specific planning and its implementation, what specific steps are now indicated to get this under way? In my judgment, an appropriate beginning is to establish in each state a legal basis under which official public responsibility for leadership in hospital development and service is created. Unquestionably, this legal basis should vary from one state to the next, depending on what is likely to work most effectively in that state.

There are those who believe government must be kept out of planning and its implementation at all cost if the voluntary system of medical practice and hospital service is to be preserved. It is my personal judgment that the voluntary system cannot survive without the public backing and support which can be most readily organized through governmental action. This by no means should suggest that government action pre-empt the field or assume responsibilities that can be carried more effectively by voluntary groups.

In some instances, voluntary organizations have developed the nucleus around which planning and leadership should be built. In other situations, primary planning activity has been undertaken by government. As previously stated in this paper, planning and its implementation should involve the appropriate blending of viewpoint and responsibility from a state-wide and local perspective as well as the viewpoints of professional, voluntary, and governmental organizations.

Through planning activity involved in the Hospital Survey and Construction Program, official health agencies have gained much experience during the past decade in hospital planning. This planning has involved the collection of information about hospital use and its interpretation into estimates of need for hospital and related services on a state-wide basis. During this same decade, several voluntary hospital councils in the United States have developed constructive programs for coordinated development of hospitals on a regional basis. Much value can be gained from the experience of both approaches.

This suggests there should be a state-wide and official basis for planning and for encouraging compliance of individual hospitals with this planning. It suggests also that, since hospitals have a responsibility for providing community service, communities in turn have a responsibility to their hospitals.

Drawing on a broad pool of local knowledge and judgment, clear goals must be established for each region or community. Hospitals must be induced to comply with these community goals. One way of achieving this is to establish by law regional councils with responsibility to develop long-range community plans. This planning, to be fully effective, must rest on systematic collection of precise information on hospital use. In my judgment, a firm basis for collecting this information and putting it to work in the community interest depends on it having official status.

In summary and in conclusion, I would like to make four points:

1. The public considers health services to be of such major importance that they should not be entrusted to the exclusive control of physicians, hospitals, and people in public health.

2. Lack of coordinated hospital development has produced duplication of expensive services, gaps in essential services, duplication of facilities, competition, inappropriate use, overbuilding in some areas and underbuilding in others.

3. Hospitals by their nature should have a primary mission of serving the community rather than engaging in competitive business.

4. There should be a state-wide and official basis for hospital planning and for encouraging compliance of individual hospitals with this planning.

Mr. Cumming is chief, Bureau of Hospitals, State Department of Public Health, Berkeley, Calif.

This paper was presented before a Joint Session of the Health Officers and Medical Care Sections of the American Public Health Association at the Eighty-Eighth Annual Meeting in San Francisco, Calif., November 1, 1960.

Request for Copies of Early APHA Publications

Certain important early APHA publications are missing from the Archives and in particular Volume I of the first official periodical of the Association, "Public Health—Reports and Papers of the American Public Health Association," covering activities in 1873-1874. Publication of this annual ceased in 1909 with the 35th volume, being superseded by the American Journal of Public Health which dates from 1910.

It would be keenly appreciated if anyone who has a copy of the Volume I referred to, or who knows where one might be procured, would communicate with Berwyn F. Mattison, M.D., executive director of the Association at 1790 Broadway, New York 19, N. Y. Dr. Mattison would also be interested in knowing about any other early publications of APHA that might be added to the Archives.

Using seven technics, the investigators who made this study undertook a six-year follow-up of 100 schizophrenic first admissions to a California state mental hospital. Earlier cohort follow-up studies are discussed, and the advantages and disadvantages of various follow-up methods are presented.

THE USE OF SEVERAL METHODS OF FOLLOW-UP ANALYSIS WITH ONE COHORT

Paul F. C. Mueller, Ph.D., and Tony Tripodi

The Problem

WITHIN the past decade interest in the development and use of cohort* follow-up methodology with mental hospital patients has increased. Since 1954 a National Institute of Mental Health committee has actively explored the possibility of establishing uniform standards for cohort studies.[26]

Any problem, with so much interest, is certain to be attacked by various experimental technics. This paper will summarize the methods of cohort follow-up analysis which have been used, and then apply these technics to a cohort of 100 first admission schizophrenic patients in order to show the information available with each technic, how this information might lead to different conclusions or hypotheses, for a specific problem such as program evaluation, and some of the advantages and disadvantages of the various methods.

A Half Century of Cohort Follow-Up Studies

Staudt and Zubin[29] state that toward the beginning of the 20th century most studies consisted in the follow-up of total hospital populations over a period of several years after admission to determine the ultimate disposition of cases.

They described Bond and Fuller, who published mostly in the 1920's and 1930's, respectively,[1-3,9-11] as pioneers in follow-up research. These early authors mainly used such psychiatric evaluations as "Unimproved," "Improved," or "Recovered" to determine what happened to patients. In addition, Fuller showed what proportions of his patients were in the hospital, discharged, or dead by designated later dates.

In 1944, Penrose, using what Zubin termed as actuarial methods, also published proportions of cohort members in specified hospital statuses† at designated periods of time following admission.[24] A similar current status methodology of cohort follow-up analysis was employed by the Ohio Department of Public Welfare since the mid-1940's.[22,23] The proportions of patients on release statuses at the ends of designated periods

* A cohort is a group of persons who share common characteristics. For example, in this study all cohort members were California state first admissions to Stockton State Hospital in 1952, and had a diagnosis of schizophrenia.

† In hospital statistical reporting systems each patient is listed as currently being in one of a number of specified reportable conditions which are related to whether the patient is in or out of the hospital, plus his manner of getting out. In the California Department of Mental Hygiene's reporting system a patient may have a current status of In Residence, Authorized Leave, Unauthorized Leave, Indefinite Leave, Transfer, Discharge, or Death.

of time following admissions have been published by Morgan in 1951 under the heading of "Net Total Released."[21]

In a series of articles, about 1950, Dorn suggested the use of life table methods for cohort follow-up analysis.[7,8] This essentially was the computation of proportions of risk groups making moves to selected first significant release statuses during periods of time. Since then, Kramer and his colleagues have endorsed and applied Dorn's technics in a number of articles.[13-17] Although using a different definition of first significant release, Malzberg in the early 1950's also used a similar method of cohort follow-up.[18-20]

It has been suggested that further follow-up beyond moves to first significant releases should be made.[13-16,27] In this case all subsequent re-entries to the hospital and re-releases would be recorded until the termination of the follow-up period. Although widely endorsed, this method, because of the difficulties involved, has not been carried out completely, e.g., Israel and Johnson report on returns from discharge but go no further.[14]

Crandell, by determining whether a patient stayed in the hospital constantly, was released and never returned, or was released and returned at least once to the hospital, would categorize a cohort into a trichotomy of "Ins," "Outs," and "Oscillating Cases."[6]

Variants of the In-Out-Oscillating Cases trichotomy had been used earlier by Fuller in 1930[9] when he divided his cohorts into "In," "Dead," and "Discharged," with the latter broken down into those patients permanently out and those returning to the hospital later. The Ohio Department of Public Welfare used somewhat similar but different groups.[22,23] However, these workers did not conceptualize as precisely a trichotomy as did Crandell.[6]

In the 1950's, Crandell, Zubin, and Mettler developed the Occlusive Index, which is the average length of stay in the hospital for each move to release made by a cohort.[5,6] Zubin also warned of the necessity of following patients for periods of not less than five years and the taking into account in computations those patients lost to the cohort through death or other causes.[29-32]

More recently, Steinburn has described the computation of a "Length of Stay Index," which is the proportion of possible follow-up time actually spent by the members of a cohort in the hospital only prior to first significant releases.[28] Crandell had previously used total time spent in the hospital in the computation of the percentage of possible time hospitalized as an outcome criterion.[6]

Follow-Up Methods

Cohort follow-up analyses fall into eight major methods:

1. Degree of Improvement Method—This method consists of first determining the mental or psychiatric condition of patients at the end of designated periods of time following admission, by rating them as "Improved," "Recovered," "Unimproved," or "Dead." Proportions are computed by dividing the number of patients in any particular mental or psychiatric condition by the number of patients in the cohort. The degree of improvement method had its greatest popularity up to the 1950's. Although still in use, it has been largely replaced by methods which use significant releases to the community as the criteria of improvement in preference to the unvalidated ratings of degree of improvement.

2. Current Status Method or Net Release Method—This method consists of following patients from admission to the ends of designated periods of time and determining the current statuses of the patients at these times. Proportions are computed by dividing the number of

patients on any particular current status by the number of patients in the original cohort. A net release proportion is the proportion of patients on release statuses.

3. Life Table Method or First Significant Release Method—In this method patients are followed only from admissions to first significant releases (variously defined but generally limited to moves to indefinite leave, discharge, death, and escape over 30 days). Proportions are computed by dividing the number of patients moving to first significant release statuses within a given period of time by the number of patients in the cohort at the beginning of this time period.

4. Release and Re-entry Method—This method considers first significant releases plus all subsequent re-entries or releases within a time period. Proportions are computed by dividing the number of patients making any move subsequent to the first significant release within a given period of time by the number of patients in the cohort.

5. In-Out-Mobile Trichotomy Method—This method consists of following patients from admission for any designated period of time and separating patients into three types: (a) "Ins," those who remained in the hospital continuously without any significant release; (b) "Outs," those who went to significant release after admission and remained out of hospital continuously; (c) "Mobiles,"* those who moved out of and back into the hospital during the selected period.

Proportions are computed by dividing the number of patients within a particular type at the end of any designated period of time by the number of patients in the cohort.

6. Occlusive Index Method—This method consists of the computation of the cohort's total length of stay in the hospital per release. The indexes are computed by dividing the cohort's total number of months of hospitalization by the number of moves to release statuses during a follow-up period.

7. Length of Stay Index Method—This method consists in the computation of an index number for the cohort by dividing the actual number of time units spent in the hospital prior to first significant releases by the possible number of time units which could have been spent in the hospital.

8. Total Length of Stay Index Method—This method totals the actual lengths of stay in the hospital, both prior and subsequent to the first significant releases of patients, and then compares this total to the possible lengths of stay from admissions to designated later anniversary dates. An index number is computed for the cohort by dividing the actual total number of time units spent in the hospital by the possible number of time units which could have been spent in the hospital.

Experimental Procedures

Selection of the Sample

The cohort consisted of 100 first admission schizophrenic patients admitted to California's Stockton State Hospital in 1952. Starting with July 1, 1952, and continuing until October 15, 1952, admissions to Stockton State Hospital were consecutively examined to determine if they fit the criteria for inclusion in the cohort. These criteria were:

(a) Schizophrenic diagnosis
(b) California state hospital first admission
(c) Nonvoluntary admission
(d) No subsequent deportation to another state
(e) No subsequent transfer to a veteran's hospital.

Schizophrenic patients were selected because patients with this diagnosis formed the bulk, 51.4 per cent, of the residential populations of California state hospitals in 1952.[26,p.28]

* Crandell, et al., used the term "Oscillating Cases."[6]

Table 1—Cohort Characteristics

Characteristics	Frequency	Characteristics	Frequency
Total	100	Total	100
Legal Classification of First Admission		Age at Admission (in years)	
Health Officer's Application	4	19 and under	5
Civil Commitment	96	20-29	26
		30-39	45
Sex		40-49	18
Male	38	50-59	6
Female	62		

The first admission criterion is common to most cohort studies and is included in the National Institute of Mental Health cohort follow-up committee recommendations.[25] This committee also suggested the separate study of cohorts with patients whose commitments have no time limitations. The diagnostic and nonvoluntary criteria restrict the present cohort to patients without definite time limits to their commitments.

The exclusion of deportees to other states follows the procedure of Kramer, et al., with the Pacific State Hospital 1948-1952 cohort,[16] and the Warren State Hospital 1916-1950 cohort.[15]

Transfers directly from Stockton to any other California state hospital are not considered as releases or re-entries. Re-entries to other California hospitals while on release status are considered as equivalent to re-entries to Stockton. In this, the present study follows the procedures of Goldstein.[13]

Criteria c through e were intended to eliminate patients whose moves to release were probably not dependent on improvement in their psychiatric condition. Moves to release, in this study, as in several other previous reports[13-16,29-31] were considered as indicative of improvement in psychiatric condition to a point where it was felt the patient could make an adequate adjustment in the community.

The characteristics of sex, age, and legal classification of admission of the cohort are shown in Table 1. It is recognized that these distributions of characteristics may be atypical of schizophrenic first admission cohorts in general or particular. However, generalizations were not made in this paper as to the follow-up outcomes for schizophrenic patients. Instead, the major interest was in the varying results obtained from the use of different follow-up methodologies with one cohort. A cohort, with another set of characteristics, might have served as well to illustrate methodological points.

Definition of a Significant Release

Following, in the main, the definition used by Kramer, et al.,[16] a patient was considered to have achieved a significant release when one of the following events occurred: (a) The patient died in the hospital. (In this study no patients died during the six-year follow-up period.) (b) The patient was placed on indefinite leave; i.e., leave from which it was presumed he would not return to the hospital. This included: Home Leave, Family Care, and Work Leave. (c) The patient received a direct discharge from the hospital. (d) The patient went on escape of over 30 days' duration. (e) The patient went on a visit of over 30 days' duration. (This

is a significant release not included by Kramer, et al.*)

Definition of a Significant Re-entry

A significant re-entry was defined as a return to any California state hospital following a significant release.

Follow-Up Period

The cohort was followed for six years from 1952 to 1958. As 79 per cent of the cohort were released within the first year, this amount of follow-up time permitted for most patients the full five-year, postdischarge, follow-up period recommended by Zubin.[29,30] The six-year follow-up period was divided into yearly periods, with the first year being divided further into quarters.

Methods of Cohort Follow-Up Analysis

All methods of cohort follow-up analysis described earlier with the exception of the Degree of Improvement Method were applied. The data were presented in tables and graphs in the manner dictated by each particular method.

The data were subjectively evaluated as to the effectiveness of getting and keeping the members of the cohort out of the hospital, and further examined to determine when the proportions for the follow-up measures reached the beginning of plateaus wherein only insignificant changes occurred.

Results

The results for the seven methods of cohort follow-up analysis are shown in Table 2 and in Figures 1, 2, and 3.

* Different data would have been obtained if other definitions of releases had been used. Malzberg, for example, used moves to death or discharge from the books as his criteria of significant releases.[19-21] Morgan considered escapes and deaths as losses to his cohort rather than releases.[22] The choice of a definition becomes an arbitrary one eventually. The inclusion of escapes over 30 days was rationalized by claiming that the patient has demonstrated that he could make his own way in the community for that length of time.

Table 2—Six Years Follow-Up Data Secured by Several Methods of Cohort Analysis

Years Following First Admission	Releases and Re-Entries*														Current† Status		Length† of Stay Index		Total† Length of Stay Index		Occlusive‡ Index
	Trichotomy*			First Signif. Release	1st Re-Entry	2d Release	2d Re-Entry	3d Release	3d Re-Entry	4th Release	4th Re-Entry	5th Release	5th Re-Entry	6th Release	6th Re-Entry	Net In	Net Re-lease	In	Out	In	Out	
	In	Out	Mobile																			
0-¼	0.80	0.19	0.01	0.20	0.01											0.81	0.19	0.93	0.05	0.93	0.05	14.2
0-½	0.51	0.46	0.03	0.49	0.03											0.54	0.46	0.80	0.20	0.80	0.20	9.8
0-¾	0.33	0.62	0.05	0.67	0.05	0.01										0.37	0.63	0.67	0.33	0.69	0.31	9.1
0-1	0.24	0.68	0.08	0.76	0.08	0.05										0.27	0.73	0.57	0.43	0.60	0.40	8.8
0-2	0.13	0.65	0.22	0.87	0.22	0.13	0.02	0.01								0.23	0.77	0.36	0.64	0.43	0.57	10.2
0-3	0.12	0.59	0.29	0.88	0.29	0.17	0.06	0.02	0.01	0.01						0.28	0.72	0.28	0.72	0.37	0.63	12.3
0-4	0.11	0.56	0.33	0.89	0.33	0.21	0.10	0.06	0.02	0.02						0.27	0.73	0.24	0.76	0.34	0.66	13.8
0-5	0.10	0.52	0.38	0.90	0.38	0.27	0.14	0.09	0.04	0.03	0.01	0.01				0.27	0.73	0.21	0.79	0.33	0.67	15.2
0-6	0.08	0.49	0.43	0.92	0.43	0.31	0.19	0.15	0.07	0.05	0.03	0.02	0.02	0.01	0.01	0.29	0.71	0.19	0.81	0.32	0.68	15.8

* Figures in these columns represent proportions of patients in cohort.
† Figures in these columns represent proportions of possible time.
‡ Figures in this column are average months in hospital per release.

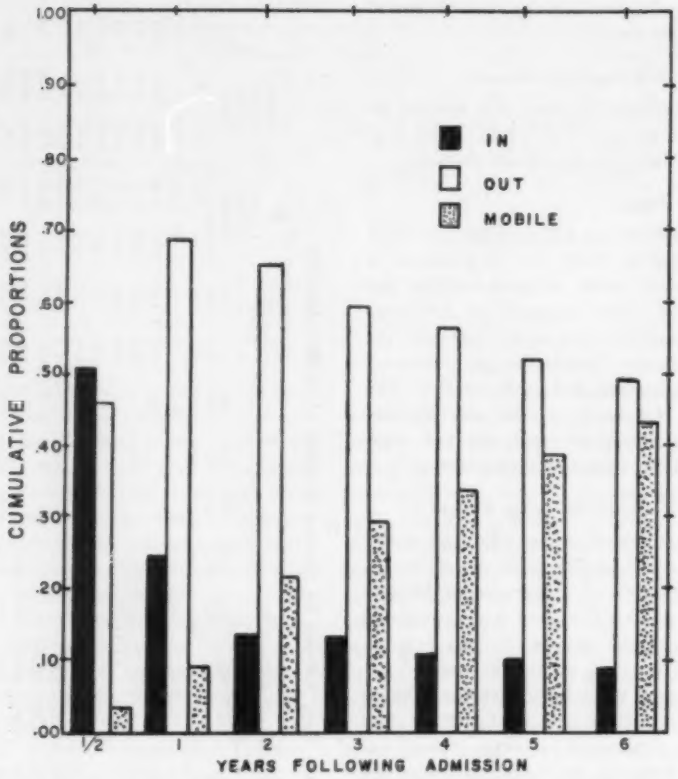

Figure 1—Cumulative Proportions in Each of Three Categories, In-Out-Mobile

In-Out-Mobile Trichotomy Method

Figure 1 and Table 2 show that the number of "Ins" declined very rapidly in the first year, less rapidly, yet noticeably, in the second year, and then fell almost imperceptibly from 12 to 8 patients over the remaining four years.

The number of "Mobiles" rose most steeply in the second year and then continued to rise steadily over the remainder of the six years to a cumulative total of 43 patients. There was every indication that the cumulative total of mobile patients might continue to rise beyond the sixth year also.

Meanwhile the number of "Outs" rose very sharply in the first year to a high of 68 patients, but then fell gradually over the remaining five years to 49 patients.

Life Table or First Significant Release Method

Figure 2 and Table 2 show that there was a sharp rise in first significant releases in the first year, a smaller rise in the second, and a very small number of additional moves afterwards.

Being a cumulative proportion with no possibility of reversal the first significant release proportion could only rise to 1.00. By the second year it had risen to 0.87. During the next four

years only five of the remaining 13 patients, or about one patient per year, managed to move to a first significant release.

Current Status or Net Release Method

Figure 2 and Table 2 show that the proportions of patients on release rose very sharply during the first year, to a 0.73; less sharply in the second year, to a maximum of 0.77; declined at about the same rate in the third year, to 0.72, and then remained almost at a plateau for the remaining three years.

Release and Re-entry Method

Table 2 shows that even in the first three to six months some patients have re-entered the hospital. By the end of the year approximately a half dozen patients already have had a second release. The general picture is one of substantial movement for all years within the range of from one to three releases and re-entries. Although as many as six releases and re-entries were recorded for a single patient, as far as the cohort as a whole was concerned, very little movement in and out of the hospital took place beyond the third release and re-entry.

Length of Stay Index Method

Figure 2 and Table 2 show that the length of stay indexes rose sharply in the first two years to 0.64, followed

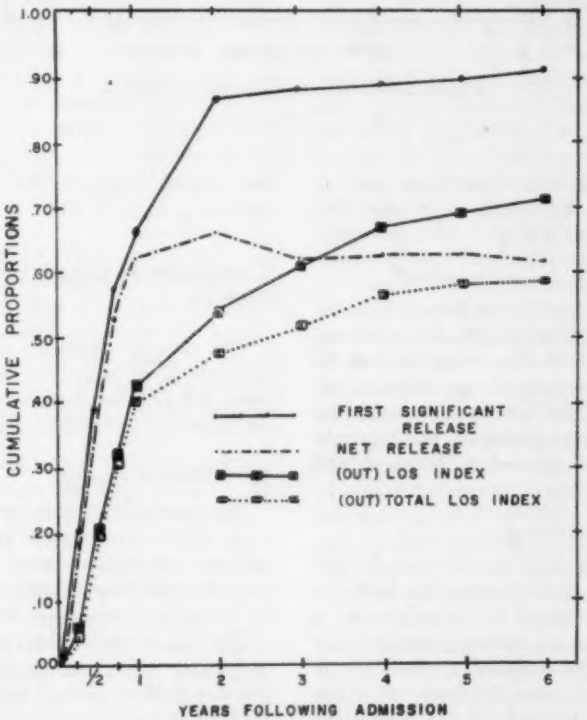

Figure 2—Cumulative Proportions Released and Length of Stay Indexes

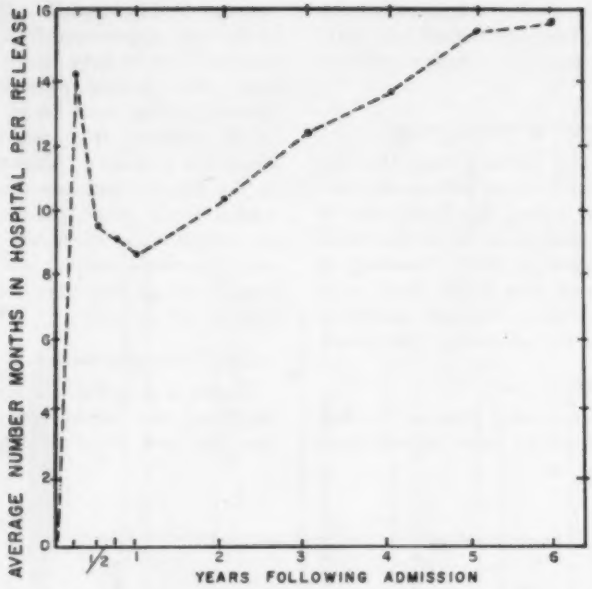

Figure 3—Cumulative Occlusive Indexes

by more gradual rises from then to the end of the sixth year when the index reached 0.81.

Total Length of Stay Index Method

Figure 2 and Table 2 show that the curve for the total length of stay indexes was quite similar in shape to that for the partial length of stay indexes, except that it was consistently lower, progressively more divergent, and flatter in slope until it reached an index of 0.68 at the sixth year.

Occlusive Index Method

With very few releases by the end of the first three months the occlusive index stood at 14.2. Then, due to a large number of releases, the occlusive index plunged rapidly to 9.8 by six months, then more gradually to a low of 8.9 by the end of the first year. From the first through the sixth year the indexes continued to rise consistently to a high of 15.8.

Comparison of Cohort Follow-Up Methods

The data provided by these several methods were examined to determine what different conclusions and hypotheses might be deducible.

Successfulness of Program

The cohort data alone, without taking other factors into account, present different impressions concerning the effectiveness of treatment programs in getting and keeping patients out of hospitals.

The impression of the greatest degree of success was given by the First Significant Release Method and the Length of Stay Index Method. These methods, along with the Total Length of Stay

Index Method, created the picture of a program becoming progressively more effective in attaining the goal of almost total hospital release for its cohort.

The In-Out-Mobile Trichotomy, Release and Re-entry, and Net Release Methods gave the impression of original program success within the first one or two years followed by a gradual decline in the ability to keep patients out of the hospital.

The Occlusive Index Method gave the impression of a maximal reduction of the average length of stay in the hospital per release between the first three months and the end of the second year. Interpretation of its data in terms of program success was more like those given to the data of the second group of methods just described above.

Thus with data from the same cohort, depending on which method of cohort follow-up analysis was used to secure outcome measures, conclusions might be drawn that the program was progressively more successful, or inconsistent in its levels of successfulness, becoming progressively less successful in the later years.

Required Follow-Up Period

Zubin has stated that a follow-up period of at least five years is necessary to evaluate program.[29,30] Others have pointed out the importance of the first and second years following admission for the majority of releases in a cohort.[4,6,14-16,23]

The present data give support for the observations that most releases take place in the first year. Additionally, the present data indicate that the First Significant Release and Net Release proportions reached levels by the third year beyond which only insignificant changes took place. It would appear that there might not be a compelling necessity for following a cohort for a full five years in order to evaluate the effectiveness of program.

Advantages and Disadvantages of the Methods

The First Significant Release Method's greatest advantage is its economy of effort. It requires the least amount of facts, as beyond the first significant releases it does not concern itself with subsequent re-entries or re-releases. Furthermore, it does not require the use of the amount of time spent in or out of the hospital in the calculation of any indexes.

For the first year of follow-up it would appear to make little difference whether the First Significant Release Method or its related methods, the In-Out-Mobile Trichotomy, Release and Re-entry, or Net Release Methods, were used.

However, later on, especially after the second year, with the cumulative number of re-entries beginning to assume sizable proportions, there is a marked divergence in the data secured from the First Significant Release Method and other related methods. The loss of information concerning the drop in the proportion of net releases has been the price of economy.

An example of what might be lost was shown by Galioni's study,[12] which used the net separation rates of a group of chronic schizophrenic patients exposed to "total push" therapy at Stockton State Hospital from July, 1950, to December, 1951. For the first 18 months the experimental group showed a greater net separation rate than did the controls. During the remaining six years, to December, 1957, the net separation rate of the experimental group fell, while the rate of the control group slowly rose until the curves for the data actually crossed. Had Galioni used only the First Significant Release Method to analyze his data he would have missed this important phenomenon.

The Net Release Method is also economical. It merely requires that on designated anniversary dates following admission a census be run to see whether

the members of the cohort are in or out of the hospital. However, this does require a data collection system whereby a patient readmitted after discharge or transfer to another state hospital can be identified.

The Net Release Method provides the most convenient single unit summaries for the movement matrix, as each proportion is the cumulative algebraic sum of all the releases and re-entries to date. For providing a single measure, which gives more meaningful information over the longer follow-up period, the Net Release Method is to be preferred over the First Significant Release Method.

The Net Release Method ignores moves that occur between anniversary dates. These can only be shown in the Release and Re-entry Method's movement matrix. This matrix shows not only all moves, including the first significant releases, but also provides all the figures necessary to compute the proportions for the Net Release and In-Out-Mobile Trichotomy Methods. However, as the matrix of movements does contain a large number of figures the trends are probably best clarified by separating out measures such as the trichotomy and net releases proportions, and presenting them along with the matrix as in Table 2.

The In-Out-Mobile Trichotomy Method by taking at least the first re-entry into account presents a supplementary picture to that provided by the Net Release Method. Whether following a patient to only one re-entry is enough and then calling him a mobile from that point on is open to question. A patient with an early release and quick re-entry with no subsequent releases, would technically be included as a "Mobile" in all subsequent cumulative proportions, while actually remaining relatively immobile.

Two of the three methods, which use the time spent in the hospital as the numerator in calculating their respective indexes, the Total Length of Stay Index and the Occlusive Index Methods, would take this lack of mobility in the later years into account. With the present cohort, the Occlusive Index Method showed the interrelationships of lengths of stay and releases most dramatically in its sharp peak and valley within the first year. However, it must be noted that the computation of these indexes requires the maximum of information concerning both moves and time.

No definite general statement is possible as to which method should be considered as preferred for follow-up studies. The various methods discussed in this paper provide answers to different questions with varying degrees of effectiveness, and are not necessarily alternative methods for answering the same question. Much depends on the information available, the effort which can be afforded, the length of time for follow-up, and the goals of the follow-up study. For example, if one wanted to show the proportion of possible days spent in the hospital, which were saved by releases, the Total Length of Stay Index Method might be best. If another goal were to contrast this saving with the greater potential savings had there been no re-entries, the Length of Stay Index Method also would most likely be used for comparison.

Summary and Conclusions

A brief survey of cohort follow-up studies used by researchers in the past 50 years was presented. Major methods used in the evaluation of patient movement patterns after admission were extracted from the literature, and seven technics were chosen to be applied in a six-year follow-up study of 100 schizophrenic first admissions to a California state mental hospital.

It was maintained that data from the same cohort yielded different conclu-

sions concerning the success in getting and keeping patients out of the hospital and the required number of years a cohort had to be followed beyond which only insignificant changes occurred.

The advantages and disadvantages of the several follow-up methods were also described, although the conditions of any study would determine which methods would be used.

ACKNOWLEDGMENTS—This paper resulted from work done in and for the Statistical Research Bureau of the California Department of Mental Hygiene. The authors wish to particularly acknowledge the clerical assistance given by Mrs. Peggy Wright and Mrs. Lillian Wade. In addition this paper has profited from the many critical comments of the professional members of the department who reviewed the manuscript.

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This paper presents an hypothesis to explain the seasonal prevalence of poliomyelitis in man, and possibly of other virus infections transmitted in a similar manner.

POLIOMYELITIS: A POSSIBLE RELATIONSHIP OF WEATHER TO THE GASTROINTESTINAL ROUTE OF INFECTION

Charles Armstrong, M.D.

IT HAS long been known that animals given parenteral inoculations with bacteria of low virulence mixed with mucin will frequently succumb, while animals receiving the same sized dose of bacteria without mucin will show little if any effect.[1]

The simplest explanation for this enhancing influence is that mucin affords a suitable environment in which bacteria can multiply, while it protects them from the cellular and perhaps serological defenses of the host.

These same properties of mucin are probably active also with viruses of certain pathogenicity. The effect of mucin upon such viruses, however, is apparently reversed probably because a virus being small, devoid of independent motility, and incapable of extracellular multiplication finds difficulty in invading membranes once it has become embedded in slowly absorbable mucin, especially if it has no special affinity for surface cells.

Influence of Weather Upon Mucous Secretions in Man—In 1942, investigations were summarized showing that air breathed by man, except under extreme conditions, is uniformly warmed to approximately 90° F, and its moisture content is regularly adjusted to near 90 per cent of saturation for that temperature.[2] These adjustments take place mostly in the upper respiratory passages. Expired air, therefore, contains approximately 35 grams of water per cubic meter.

Thus in summer when atmospheric temperature approaches 90° F or above and relative humidity is high, it follows that the air passages will make but little adjustment in either the temperature or moisture content of inspired air. However, the cold air of winter has little capacity for holding moisture and when it is breathed and warmed to 90° F the upper respiratory membranes must supply, through their secretion, the moisture to induce 90 per cent of saturation. Such adjustments take place promptly, moreover, they must continue to do so as long as the atmosphere remains dry, even though it be artificially heated. Otherwise, the membranes would soon become parched. The abundant secretions of the nose and throat in winter and their relative paucity in summer are matters of common experience.

It is certain that poliomyelitis tends to wane in cold weather when the mucous secretions of the upper air passage are copious and that the disease tends to flourish in warm weather when the secretions tend to be slight.

In 1950, the author offered these variations in the secretions of the nose and throat as a possible explanation for

the seasonal variations in poliomyelitis incidence as usually found in the temperate zones, and the general absence of such variations in the tropics.[3]

In support of this hypothesis a striking direct correlation between the weekly incidence of poliomyelitis cases and the average weekly relative humidity of atmospheric air warmed to the temperature of inspired air (90° F) was demonstrated for selected outbreaks.[4-6] Furthermore, it was demonstrated that commercial mucin when mixed with such viruses as rabies, poliomyelitis, or herpes simplex tended to hinder infection when administered parenterally into susceptible animals.[3]

The experimental findings reported here confirm and extend these earlier observations in that they attempt to explain more directly the possible influence of weather upon infection via the gastrointestinal tract.

Composition and Behavior of Mucous Secretions—In addition to water, the secretions of the upper air passages contain mucin, lysozyme, antibodies, cells, organisms, viruses, dust particles, salts, and so forth. As water evaporates from the membranes (especially in cold weather) a concentrated residue containing these substances is therefore left behind. Most dust particles and organisms not filtered out by nasal hairs are caught on the irregular, mucous-covered membranes, so that breathed air is relatively sterile when it reaches the lungs.[7] Such snared particles, together with the concentrated secretions, may be either eliminated to the outside or propelled by the cilia covered membranes toward the throat. Here they are joined by the mucous-containing secretions from the mouth which are carried backward by the sucking action of the cheeks, tongue, and palate and are periodically swallowed,[8] otherwise the passages soon would become clogged. Probably few organisms ultimately entering the stomach escape this contact with mucus in the upper respiratory tract or throat, excepting those that are swallowed with food or drink. There is, however, little evidence incriminating either food or drink as carriers of poliomyelitis infection.

Mucus also originates in the gastrointestinal tract, quite independently of season or weather as far as we know. Therefore, if mucin in the gastrointestinal tract plays any part in the seasonal incidence of poliomyelitis, it would seem that the swallowed upper respiratory secretions (which vary with the seasons) are likely to play the more significant role. It was, therefore, decided to see if mucin together with virus would, when introduced via stomach tube, influence the development of infection in susceptible animals.

Experimental Procedures—The only animals susceptible to poliomyelitis given via stomach tube are man and certain primates, all of which are impractical for the purpose of these experiments. Therefore, lymphocytic choriomeningitis (LCM)* virus and white mice were selected for a portion of these studies.

LCM is a natural disease of mice, which are readily infected via stomach tube, with results closely simulating those of poliomyelitis in man. For instance LCM virus withstands digestion, and moderate doses of the virus in mice usually result in inapparent infection with the development of immunity, while larger doses in mice may cause symptoms leading to death.

The mucin was "Granular Type 1701 W" prepared by Wilson Laboratories, Chicago, Ill. This was suspended in tap water without employing heat. The pH was adjusted to 6.8 and the mucin stored

* The LCM virus employed was the original strain isolated in 1933.[9] It had been through 386 mouse-brain passages at the time these studies were begun. Emulsified infected mouse brain without centrifugation, filtration, or glycerination was regularly employed as virus.

in the cold, +4° C, until used. Stored suspensions gradually became alkaline and were discarded when their pH reached 7.2 or above.

Stomach-tube inoculations were made under ether anesthesia with a 3-inch No. 21 gauge needle having a rounded tip. The dose was uniformly 0.2 ml. The needle was wiped dry before each inoculation. Where two or more cages of mice received the same inoculum the animals were inoculated one from each cage alternately. Mice that died were sometimes eaten by cage mates who would thus get additional virus. Attempting to equalize this feature, the test and control mice were for a time kept in the same cage. Later we found little trouble with cannibalism if food and water were always available, if dead animals were promptly removed, and overcrowding was avoided. Purina pellets and water were available at all times unless otherwise stated. The mice were National Institutes of Health's general purpose, LCM-free, white strain, weighing 18-22 grams. Repeated small tests were preferred over fewer larger ones. Representative experiments are shown in Table 1.

Experimental Results—Groups of mice, with pellets and water always available, were given via stomach tube equal amounts of virus in tap water, 0.2 ml, one group receiving virus with and one without mucin.

In order to determine whether immunity developed after moderate doses of LCM were administered (regularly causing no apparent infection), intracerebral challenge was employed with a dose of virus lethal for about 100 per cent of normal mice. By this procedure it was found that mice receiving virus plus mucin via stomach tube from three to ten days before challenge died in greater numbers as a result of challenge than did those that received an equal amount of virus in tap water (without mucin), Table 1, Experiments 1209, 1212, 1211. However, by the tenth day the resistance of the two groups tended to become equal.

It may be seen in Table 1, Experiments 1209 and 1212, that mice receiving virus in tap water (no mucin) reached a stage of group immunity four days earlier than the same degree of immunity that was attained by groups receiving an equal dose of virus with mucin (bold face figures, Table 1). By reference to Table 1, Experiment 1217, it is apparent also that the development of immunity tends to be more hindered as the concentration of the mucin increases, while mucin alone has no effect upon immunity response unless combined with the virus.

These results may be explained by assuming that mucin administered with virus tends to hinder but does not prevent the absorption of this virus from the gastrointestinal tract, depending upon its concentration. That a hindering of absorption may delay the development of immunity by lessening the infection is indicated in Table 1, Experiment 1234, where a similar effect was produced by reducing the dose of virus in the absence of mucin.

As might be expected, however, if the dose of virus is made sufficiently large (Table 1, Experiment 1223) or, probably, by employing a more potent virus, the protective effect of mucin may be overridden. In other words, the apparent effect of mucin is limited to a certain range of dosage for virus of a given virulence, depending upon its concentration.

It appears that in poliomyelitis of man the usual dose of naturally acquired virus would fall within the range of mucous influence, since in nature it is estimated that for each 100 subclinical cases in man there is but one clinically recognizable case.[10-12] This bespeaks a low pathogenicity for the virus in naturally acquired infections, even in summer. Thus a modest hindering effect, such as mucin exerts in experimental

animals, should lessen the development of recognizable and possibly unrecognizable cases as well. It is further possible that a mixture of upper respiratory mucus with virus might tend to hinder the spread of the virus to normal persons through coughing and sneezing, since mucin was shown to be a most effective menstruum in preventing Lactobacilli from becoming air-borne.[13] Thus epidemics should wane with cold weather as they usually do. While with a similarly transmitted virus of exalted virulence the number of virus particles, which with a less potent virus would result in immunity but no symptoms, may with a more pathogenic strain or with some other virus be sufficient to cause illness or even death. Such a virus, as far as mucus is concerned, might spread in any climate or show even a winter prevalence, if conditions for spread from person to person were sufficiently favored as by indoor contacts.

Table 1—Choriomeningitis Virus with and Without Mucin (Commercial) in Mice via Stomach Tube

Experiment No.	Cage No.	LCM-Infected Brain Emulsion by Stomach Tube, Day 0		Food and Water (F and W) Supplied Mice	Challenge with LCM-Infected Brain Emulsion, i.c., and Results			
		Dilution	Suspended in:		Dilution	Day	No. Mice Challenged / No. Mice Dead	Per cent of Mice Dead of Challenge
	2	1:500	No mucin—tap water		1/5,000	3	7/3	42.8
	3	"	" " " "		"	6	7/1	14.3
	8	"	" " " "		"	10	7/1	14.3
1209								
	1	"	0.5% mucin in tap water	0.05% mucin in drinking water	"	3	7/6	85.7
	1	"	0.5% mucin in tap water	0.05% mucin in drinking water	"	6	7/4	57.0
	1	"	0.5% mucin in tap water	0.05% mucin in drinking water	"	10	7/1	14.3
	2	"	No mucin—tap water		1/1,000	3	8/3	37.5
	2	"	" " " "		"	5	8/1	12.5
	2	"	" " " "		"	7	7/1	14.3
1212								
	1	"	0.66% mucin in tap water		"	3	8/6	75.0
	1	"	0.66% mucin in tap water		"	5	8/5	62.5
	1	"	0.66% mucin in tap water		"	7	8/3	37.5

Table 1—Continued

Experiment No.	Cage No.	LCM-Infected Brain Emulsion by Stomach Tube, Day 0		Food and Water (F and W) Supplied Mice	Challenge with LCM-Infected Brain Emulsion, i.c., and Results			
		Dilution	Suspended in:		Dilution	Day	No. Mice Challenged / No. Mice Dead	Per cent of Mice Dead of Challenge
1211	2	1:1,000	No mucin—tap water		1/1,000	4	25/8	32
	4	"	" " " "	0.05% mucin in drinking water	"	4	25/6	24
	1	"	0.66% mucin in tap water	0.05% mucin in drinking water	"	4	25/14	56
	3	No virus	0.66% mucin in tap water	0.05% mucin in drinking water	"	—	25/24	96
1217	1	1:500	2.0% mucin in tap water		1/1,000	3	10/5	50
	2	"	0.5% mucin in tap water		"	3	10/3	30
	3	"	0.125% mucin in tap water		"	3	10/1	10
	4	No virus	2.0% mucin in tap water		"	—	10/10	100
	1-2 3-4	No virus	10 mice from each cage 1-2-3-4		"		40/40	100*
1234	1	1:500	None		1/1,000	3	8/3	37.5
	2	1:5,000	"		"	3	7/5	71.0
1233	2	1:500	Agar 0.15%	0.05% agar in drinking water	1/800	4	10/4	40
	4	1:500	None		"	4	8/1	12.5
1223	4	1:370	No mucin—tap water		1/1,000	3	10/8	80
	3	1:370	2.0% mucin		"	3	10/8	80
	4 and 3	—	None		"	—	20/20	100

* Control: to see if infected mice affected cage mates.

Combined 1209, 1212, 1211: of 70 mice which received LCM virus with mucin 39 or 55.7 per cent died, while of 69 mice which received LCM virus with tap water (no mucin) 18 or 26.1 per cent died.

Effect of Commercial Mucin Combined with the Virus of Encephalomyocarditis* (EMC) and Administered to Mice via Stomach Tube—Encephalomyocarditis (EMC) is a natural disease of mice, which are readily infected via stomach tube. Moreover, if symptoms develop they usually lead to paralysis and death within from three to six days. Thus it is possible to determine the presence or absence of any protection afforded by mucin, by observing the number of deaths that occur among mice receiving EMC virus plus mucin and the controls. Referring to Table 2, Experiments 1291, 1317, 1320, 1324, and 1336, it may be seen that mucin under the conditions of these experiments affords a definite protection.

Effect of Human Throat Mucus Mixed with EMC Virus via Stomach Tube—Freshly raised, clear mucus from the throat of an individual who had no de-

* The encephalomyocarditis virus, isolated in Africa, was supplied through the courtesy of Dr. Lawrence Kilham.

Table 2—Encephalomyocarditis Virus with and Without Mucin (Commercial) and (Human) in Mice via Stomach Tube

Experiment No.	Cage No.	Dilution of Virus via Stomach Tube Dose 0.2 ml	Concentration of Mucin Given via Stomach Tube with Virus	Mice Inoculated / Mice Dead	Per cent Mice Dead of Inoculation
	1	1/3,000	No mucin—tap water	17 / 15	88.2
1291					
	2	"	1.5% mucin in tap water	17 / 6	35.2
	7	1/1,000	No mucin—tap water	16 / 14	87.5
1317					
	1	"	1.5% mucin in tap water	16 / 7	43.7
	3	1/4,000	No mucin—tap water	8 / 7	87.5
1335	2	"	1:4 dilution human throat mucus in tap water	8 / 5	62.5
	1	"	0.75% mucin in tap water	8 / 2	25.0
	4	1/2,000	No mucin—tap water	8 / 8	100.0
1320					
	3	"	1.5% mucin in tap water	7 / 5	71.0

Table 2—Continued

Experiment No.	Cage No.	Dilution of Virus via Stomach Tube Dose 0.2 ml	Concentration of Mucin Given via Stomach Tube with Virus	Mice Inoculated / Mice Dead	Per cent Mice Dead of Inoculation
	1	1/2,000	No mucin—tap water	8 / 7	87.5
1324	2	"	1:4 human mucus in tap water	8 / 5	68.7
	3	"	0.75% mucin in tap water	8 / 5	68.7
	4	1/2,500	No mucus—tap water	7 / 7	100.0
1331					
	1	"	⅛ human mucus in tap water	8 / 4	50
	1	1/3,000	0.75% mucin in tap water	8 / 5	62.5
1336	2	"	0.2% agar in tap water	8 / 2	25.0
	4	"	Tap water only	8 / 8	100.0

All tests combined 87 mice receiving EMC virus plus mucin 44 or 51.1 per cent dead.
All tests combined 80 mice receiving EMC virus in water (no mucin) 74 or 92.5 per cent dead.

tectable EMC antibodies in his blood was administered to mice via stomach tube and produced no ill effects. When this mucin was combined with EMC virus it did tend to protect mice against the infection even though diluted (Table 2, Experiments 1324, 1331, and 1335).

Effective Dose of Virus—We have found that commercial mucin in concentrations of from 0.125 per cent to 2 per cent in tap water offers a measure of protection when mixed with LCM or EMC virus and given via stomach tube in doses of 0.2 ml. According to body weight this dose for a 20-gram mouse would correspond to about a pint of the corresponding concentrations for a child weighing 100 lb.

The effective dose of mucin is, however, not related to the weight of the animal but to the size of the virus dose, and it seems probable that the virus given to these mice contains more pathogenic capacity than does the dose of poliomyelitis virus usually acquired in the natural infection of man.

How Does Mucin Protect?—The fact that commercial mucin has a hindering effect upon experimental infections by rabies, poliomyelitis, herpes simplex,

LCM and EMC virus,* and that it acts with bacteria, although with an opposite effect, and that agar has a similar effect (Table 1, Experiment 1233 and Table 2, Experiment 1336) points to the probability that its effects are dependent upon its physical properties rather than upon any specific chemical characteristics. It should be pointed out, however, that viruses probably do differ in their capacity to invade membranes. For instance, Rake[14] found that equine encephalitis virus passed through the nasal membranes of rabbits in a few minutes while St. Louis encephalitis, rabies, and louping ill could not be demonstrated to do so in less than 24 hours.

Summary

Mucin, when mixed with certain bacteria and injected into an animal, has long been known to enhance their pathogenicity.[1]

The same properties of mucin affect certain viruses as well as bacteria, but instead of enhancing they tend to inhibit the pathogenicity of such viruses.

This reversal of the effect of mucin with viruses, as compared with bacteria, is probably related to the fact that viruses are unable to multiply until they can reach and invade susceptible cells, while bacteria find in mucin itself a suitable menstruum in which to flourish.

Based largely upon this protective action of mucin in certain virus diseases, first recognized in 1950,[3] and upon the seasonal variation on its production, an hypothesis is presented purporting to explain the seasonal prevalence of poliomyelitis in man and possibly certain other similarly transmitted virus infections.

The hypothesis is capable of explaining:

1. The seasonal variation of poliomyelitis incidence irrespective of whether infection occurs via the upper respiratory tract, the throat, or the gastrointestinal route.
2. The minor variations in incidence commonly observed in poliomyelitis outbreaks of limited geographical extent.
3. Why poliomyelitis tends to appear later and to disappear earlier in temperate zones, as one goes either north or south from the equator, and the hypothesis is elastic enough to make occasional cold weather outbreaks understandable.

* That certain of these virus diseases show no special summer incidence in man, even though their infectiousness for experimentally inoculated mice is hindered by mucin, is readily understood when we consider their natural methods of spread, as rabies by direct inoculation, EMC probably by infected food, and the like.

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The epidemic of Asian influenza in 1957 provided an opportunity to study the possible effects of influenzal infection on the outcome of pregnancy. The findings presented here are suggestive of an adverse effect, but the authors indicate need for further study.

THE EFFECT OF ASIAN INFLUENZA ON THE OUTCOME OF PREGNANCY, BALTIMORE, 1957-1958

Janet M. B. Hardy, M.D.C.M., F.A.P.H.A.; Edward N. Azarowicz, Ph.D.; Anna Mannini, Dr. Biol.; Donald N. Medearis, Jr., M.D.; and Robert E. Cooke, M.D.

DURING the past four decades many publications have appeared concerning the effect of influenza on pregnancy. Whereas experimental studies tend to support the conclusion that maternal infection detrimentally affects the fetus,[1,2] clinical reports have both affirmed[3-6] and denied[7-9] this effect.

The reasons for these seemingly contradictory reports are not known, but some possible explanations are apparent. The methods employed may have affected the findings. Two such methods deserve mention. Some studies have been retrospective in the collection of historic and laboratory data.[3,4,6] In other investigations the diagnosis of influenza has depended solely on elicitation and evaluation of clinical symptoms and signs.[5-7] The former is generally acknowledged as probably misleading. The latter not only fails to include inapparent infections, the effect of which although not known must be considered and elucidated, but it may also include illnesses of another etiology. Neither can reliably ascertain when infection occurred during pregnancy, and this may be a determinant of conceptal damage. There is still another factor which is unavoidably common to this and many other investigations that probably contributes to the conflicting results: the small numbers of patients included in the study and control groups.

The epidemic of influenza A_2 (Asian) virus infection in 1957 provided an excellent opportunity to employ prospective and serologic methods to study the effect of influenzal infection on the outcome of pregnancy. It was postulated that the effect, if any, might be manifest by an increased number of abortions, congenital malformations, premature deliveries, stillbirths, neonatal deaths, or neonatal morbidity occurring among those infants whose mothers had influenzal infections after conception and prior to delivery. The results of this prospective study in which the diagnosis of influenza was serologically confirmed is herein reported.

Materials and Methods

1. Clinical and Epidemiologic Observations

Influenza Type A_2 virus ("Asian" strain) began to appear in Baltimore in late September, 1957, and by the end of October was widespread in the community.

Starting on October 14, 1957, and

continuing until February 1, 1958, all patients visiting the Obstetrical Prenatal Clinic of the Johns Hopkins Hospital were enrolled in the study. They were interviewed at approximately monthly intervals until they delivered. A questionnaire was completed at each visit to determine whether they had had "flu-like" illness, the date of its onset, its duration and type, inoculations of influenza vaccine, and any household exposure to "flu-like" illness.

All deliveries occurred at the Johns Hopkins Hospital. The mother and infant were carefully evaluated at the time of delivery by the obstetrician; and on admission to and discharge from the nursery a pediatrician examined each infant. In some instances additional follow-up observations were made. Autopsies of relevant cases were performed at this hospital and reviewed by the authors, as were all case histories.

2. Laboratory Investigations

Serums—Blood was drawn at approximately monthly intervals: at each prenatal visit, at delivery, and at the postpartum visit. After separation from clots, serums were stored in screw-capped glass vials at −20° C. All were tested first for complement fixing (CF) antibody. Only those giving a negative result were tested by the hemagglutination-inhibition (HI) method. All serums from each patient were tested simultaneously for either CF or HI antibody.

Antigen—For both tests antigen was prepared from influenza A/Japan/305-57 seed virus (kindly supplied by Dr. Keith Jensen) by allantoic inoculation of ten-day-old embryonated hens' eggs. After 48 hours' incubation at 37° C the allantoic fluids were harvested, pooled, lightly centrifuged, and then stored in aliquots at −40° C.

Complement Fixation Tests — The method employed was that of Osler as modified by Roizman.[10] Serums were inactivated for 30 minutes at 56° C. The dilution of serum to be tested (0.15 ml), complement (five units), and antigen (0.25 ml containing two units as determined by box titration) were mixed and incubated overnight at 4° C. After one-half hour at room temperature, the hemolytic system consisting of 0.1 ml equal parts, hemolysin and 5 per cent sheep RBC was added and the mixture incubated at 37° C (in a water bath) with interval shaking (every ten minutes) for one hour. The pattern was read after an additional two hours at room temperature. The titers are expressed as the highest initial serum dilution which gave more than two plus fixation.

Hemagglutination-Inhibition Tests—These were performed essentially as described by Jensen.[11] Phosphate buffered saline pH 7.2 was used as diluent. Serums were heated at 56° C for 30 minutes and treated with periodate to remove nonantibody inhibitors because the employed antigen was sensitive to these nonspecific inhibitors. Periodate treatment consisted of mixing one volume of serum with two volumes of M/90 potassium periodate and storing overnight at 4° C. Excess periodate was neutralized by adding an equal quantity of 1 per cent glycerol in saline. This procedure has been shown to satisfactorily remove these inhibitors.[12] Titers are expressed as the highest initial dilution of serum which produced complete inhibition of hemagglutination.

Results

1. Serologic and Epidemiologic Data

Three hundred and seventy-three (56 per cent) of the 671 patients studied had a history of a "flu-like" illness. Although an average of 3.8 bloods was drawn from each of the 671 patients included in the study, since it was begun after the onset of the Asian influenza outbreak in Baltimore, relatively few patients were encountered in whose serums were demonstrated a fourfold

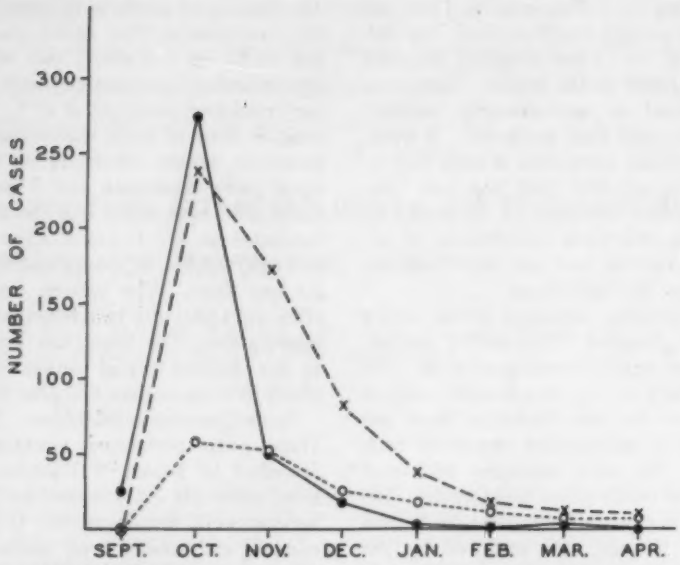

Figure 1—Monthly Distribution of Clinical Illnesses and Serologic Diagnosis, "Asian" Influenza, Baltimore, 1957-1958, Woman's Clinic, the Johns Hopkins Hospital (•——• Month During Which Cases of Clinical "Flu" Occurred; X — — X Month When Single Diagnostically Significant Serum Was Obtained; o- - -o Month During Which Fourfold Rise or Fall in Antibody Titer Was Observed)

rise in antibody titer. Accordingly, that antibody titer which for a single specimen could be said to be of probable diagnostic significance was arbitrarily defined after reference to the literature. Those titers are, for the complement fixation test, 1:20; and for the hemagglutination-inhibition test, 1:10.[13-17] The diagnosis of "flu" was serologically confirmed in 94 per cent of the 373 cases. Two hundred and ninety-eight individuals denied having a "flu-like" illness. However, 222 (75 per cent) of these showed serologic evidence of influenza.

Of the 671 patients included in the study, 471 (83.6 per cent) had diagnostically significant serum antibody titers as evidence of having had an Asian influenzal infection. Thirty-nine per cent of those individuals with significant antibody levels denied having had flu-like symptoms. Twenty-four patients gave a history of "flu-like" illness but were found not to have significant antibody titers. Thus, 571 patients had clinical and/or serologic evidence of Asian influenza, an attack rate of 85 per cent. Thirty-nine per cent (222) of these were inapparent infections. Sixty-one per cent (349 individuals) of those with diagnostically significant titers gave a history of influenzal illness.

Fourfold rises were detected in the serums of 61 individuals. In 62 other individuals fourfold falls in titer were observed to occur within three months after the first specimen was obtained. The month during which influenzal infection was thought to have occurred as adjudged by a history of clinical "flu," a single diagnostically significant sero-

Table 1—Per cent of Clinical Category Having Particular Serologic Result

Clinical Category	Serologic Result					Other (Negative)	Total
	CF		HI				
	1:40*	1:20	1:40*	1:20	1:10		
Clinical influenza (373 individuals)	63	13	10	5	3	6	100
No clinical influenza (298 individuals)	32	19	8	9	7	26	101

* As routine, the highest serum dilution tested was 1:40.

logic determination, or a fourfold rise or fall in antibody titer is shown in Figure 1.

Seventy-three per cent of the cases occurred in October; 93 per cent during September, October, and November. Although arbitrary criteria had to be employed to time the infection, the resulting data are internally consistent. This time was used in association with the EDC, the birth weight, and the date of termination of pregnancy to establish when during pregnancy infection occurred.

Tables 1 and 2 show the distribution of serologic results in various categories. Data concerning vaccinated individuals are included. Only 34 persons had been vaccinated, the kind of vaccine is not known. Most of them had only one inoculation; 16 had a "flu-like" illness and many of these were vaccinated at the time of illness. All vaccinated persons who were ill had positive serums. Three (9 per cent) of the vaccinated individuals had negative serums, none of these had had a "flu-like" illness. In tabulating the outcome of pregnancy, data concerning these vaccinated individuals were not included. Seventy-six per cent of the serologic diagnoses were determined by CF test and 24 per cent by HI test. All of the samples of serum of 15 per cent of the study population were negative by both tests.

Table 2—Per cent of Serologic Result Which Occurred in Clinical Category

Serologic Result		Clinical "Flu"	No Clinical "Flu"	Total
CF	1:40	72	28	100
	1:20	46	54	100
HI	1:40	60	40	100
	1:20	40	60	100
	1:10	37	63	100
Other (Negative)		24	76	100

2. Outcome of Pregnancy in Relation to Influenza

Twenty-seven women left Baltimore or were referred to Baltimore City Hospitals because of financial requirements, and 33 women received influenza vaccine; therefore, the results of 611 pregnancies are described.

Table 3 shows the outcome of pregnancy for 332 women who had serologically confirmed influenza, for 206 women who had inapparent infection, and for 73 women who had no evidence of influenzal infection. The incidence of abortion, stillbirth, prematurity, and congenital malformations is higher in the infected than in the uninfected group The attack rate of 85 per cent left an uninfected population which was not large enough, however, to be a significant control group. Accordingly, the outcome of pregnancies in this hospital

Table 3—Outcome of Pregnancy in Relation to Clinical Influenza, 611 Pregnancies: 194 White, 417 Negro Patients

	Clinical "Flu," Serologically Confirmed, 332*		No Illness, Serologically "Positive," 206		No Illness, Serologically "Negative," 73	
	No.	%	No.	%	No.	%
Abortion	6	(1.8)	2	(0.9)	0	(0.0)
Stillbirth	8	(2.4)	2	(0.9)	1	(1.3)
Premature	27	(8.0)	20	(9.0)	4	(5.5)
Neonatal death	7	(2.1)	5	(2.4)	2	(2.7)
Neonatal morbidity	29	(8.7)	19	(9.2)	9	(12.3)
Congenital malformation	11	(3.0)	12	(5.9)	1	(1.3)

* Number of individuals in stated category.

during the 1956-1959 period is shown for comparison in Table 4. The comparison indicates that the differences noted in Table 3 may not be significant. Further suggestion, however, that influenza infection does affect pregnancy detrimentally is obtained when the data are analyzed according to the trimester during which the infection apparently occurred (Table 5). Abortion, stillbirth, and congenital malformation occurred more frequently in individuals infected during their first trimester than those afflicted later in pregnancy or not at all. In this regard, there was no apparent difference between individuals who had a "flu-like" illness (serologically confirmed) and those who had an inapparent infection. Moreover, patients who had a severe illness, including five who were admitted to the hospital with influenzal pneumonia, did not appear to have an increased incidence of pregnancy wastage (all five hospitalized women were later delivered of normal newborns).

The kinds of anomalies found in the course of this study are listed in the footnote to Table 5. Supernumerary digits appear frequently in this Negro population, and on the basis of familial occurrence appear to have a genetic determinant.

Summary

The results of the serologic investigations in so far as they pertain to the immunology and epidemiology of influenza epidemics conform to the excellent and extensive data already obtained by others. A very high attack rate was experienced by the pregnant women who attended the Woman's Clinic of the Johns Hopkins Hospital. The history of clinical infection was serologically confirmed in almost all in-

Table 4—Fetal Losses, Woman's Clinic, the Johns Hopkins Hospital

	1956	1957	1958	1959
	Per cent			
Abortion*	3.6	4.0	3.9	6.0
Stillbirth†	2.0	2.0	2.1	2.3
Neonatal death†	2.0	2.6	2.8	2.7
Prematurity*	12.0	12.0	11.9	12.1

* Ward patients only.
† Ward and private patients.

Table 5—Outcome of Pregnancy in Relation to Trimester in Which Influenza Occurred

	First Trimester 75*		Second Trimester 183		Third Trimester 275	
	No.	%	No.	%	No.	%
Abortion	6	(8.0)	3	(1.7)	0	(0.0)
Stillbirth	3	(4.0)	4	(2.1)	4	(1.4)
Premature	10	(13.0)	14	(7.7)	12	(4.3)
Neonatal death	0	(0.0)	2	(1.0)	9	(3.2)
Neonatal morbidity	16	(21.3)	17	(9.2)	30	(10.0)
Congenital malformation	8	(10.7)†	8	(4.3)‡	7	(2.5)§

* Number of individuals in stated category.
† Three cardiac malformations (one with arthrogryposis), one twin holocardiac monster, three syndactylia, one a large area of hyperpigmentation.
‡ One hip dislocation, one malformed jaw, one multiple malformations, one malformed mouth, three supernumerary digits, one questionable mongoloid.
§ Two cardiac malformations, one club feet, one imperforate anus, one hypospadias, two supernumerary digits.
Note: These malformations were recognized at birth or in the nursery with the exception of two cases found in the review of 19 autopsy protocols, and two cases found during follow-up of 367 children.

stances, 94 per cent. Of great significance, however, is that 75 per cent of the women who denied having a "flu-like" illness had serologic evidence of infection and that 39 per cent of all infections were inapparent. This high attack rate precluded the simultaneous study of a significantly large control group. Infection seemed to adversely affect the outcome of pregnancy, especially if it occurred during the first trimester. The absence of comparative data from a true control group, however, precludes attaching too much significance to these findings. Those types of pregnancy wastage which tend to reflect adversity in the first trimester were most affected. Much more extensive data will be required to establish whether the apparently increased incidence of pregnancy wastage following first trimester influenza is real.

ACKNOWLEDGMENT—The authors wish to acknowledge the assistance of Dr. John Geldrich and Mrs. Grace Zawhari, P.H.N., who did the interviewing; Mrs. Laverne Grove, who assisted with the serologic testing; and Mr. Todd Frazier, biostatistical consultant.

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This work is supported in part by the Pierce-Butler Fund and the Collaborative Project of the National Institute of Neurological Diseases and Blindness, U. S. Public Health Service Research Grant No. B 2371.

APHA Medical Care Section to Hold Regional Meeting

The Regional Membership and Activities Committee of the APHA Medical Care Section extends a cordial invitation to all those able to attend an open meeting on September 12, 1961, in New York City. The proposition to be discussed at that time is: "The American people deserve the best medical care—What are we doing about it? And what should we be doing about it?"

On hand to offer some answers to these questions will be: Chairman Albert W. Snoke, M.D., director, Grace New Haven Hospital; E. M. Bluestone, M.D., consultant, Montefiore Hospital; John J. Burke, M.D., commissioner, Division of Hospital Review and Planning, New York State Department of Health; J. Douglas Colman, president, Associated Hospital Service; Henry N. Pratt, M.D., director, New York Hospital; and Martin A. Steinberg, M.D., executive director, Mt. Sinai Hospital.

The meeting will begin at 9:30 a.m. in the McMillin Theater, Columbia University, 116th Street and Broadway. No fee for registration will be charged.

The problem of Q fever in Pennsylvania was studied by tracing human cases and by performing serological tests on animals associated with these cases. Findings in this study seem to indicate that the occurrence of human cases is related to Q fever titers in the local cattle population.

STUDY OF Q FEVER IN ANIMALS AND MAN IN PENNSYLVANIA

Robert R. Marshak; Julius Melbin; and Max J. Herman

PREVIOUS work has shown that Q fever in man can no longer be regarded as an exotic disease, but should be considered in the differential diagnosis of any acute febrile illness for which the cause is obscure. Human beings, cattle, goats, sheep, bandicoots, and ticks may be regarded as known natural reservoirs.[1-9] In addition, dogs[3] and fowl[10] have been shown to be naturally infected and cats[11] and fowl[10] experimentally infected.

Infection with Coxiella burnetii has been established in Ohio,[8] Wisconsin,[9] Arizona,[12] Illinois,[13] Texas,[14] Utah,[15,16] Iowa,[17] California,[6,7,18] and other states. In addition, two clinical cases of Q fever in Pennsylvania have been previously reported[19,20] and six of 73 veterinarians tested in Pennsylvania had "positive" titers.[21] Infection within a dairy herd has also been demonstrated,[8] the distribution of infection suggesting the presence of enzootic foci of bovine Q fever.

Three general hypotheses as to the modes of spread of Q fever from cattle to man have been suggested, i.e., occupation in dairy or livestock industries, residence in close approximation to a dairy or livestock yards, and household use of improperly pasteurized or raw milk.[18,22-25]

The purpose of this study was to investigate the relationship of Q fever in man and animals in Pennsylvania by tracing documented human cases. In addition, a survey of Pennsylvania cattle was conducted to obtain information about the prevalence of Q fever antibodies in this species.

Methods and Materials

A. Sampling

Records of well documented human cases of Q fever in Pennsylvania, confirmed by the complement fixation test (CFT), were obtained from Dr. Klaus Hummeler, Viral Diagnostic Laboratory, Children's Hospital of Philadelphia. Nine of these cases were investigated with emphasis on known animal contacts and/or animals in the vicinity. Blood samples were collected from these animals and the serum tested by the CFT.

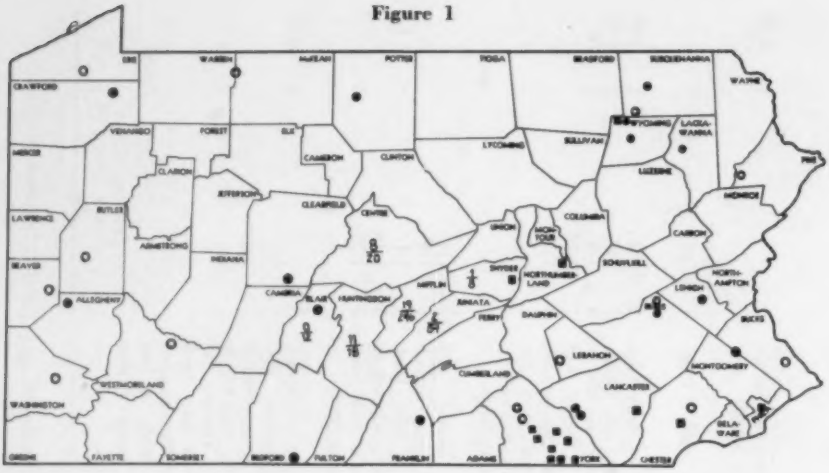
Table 1—Summary of Data on Nine Human Cases of Q Fever in Pennsylvania, Including CFT Titers of Animals in Close Association with Patients

Case No.	Age	Sex	Occupation	Residence	Milk Consumed	Clinical Diagnosis	Successive Q Fever CFT Titers	Case History	Species Tested for Q Fever (CFT)					
									Bovine		Equine		Canine	
									No.	Titer	No.	Titer	No.	Titer
1	35	M	Carpenter	Rural, Lancaster County	Pasteurized	Psittacosis	1:256; 1:512	Worked on old building and dairy farm just prior to illness. Samples collected from neighboring farm animals.	5 1 3 5 4 8	<1:4 1:4 1:8 1:16 1:32 >1:32	2 1	1:4 1:8	1	1:4
2	40	M	Agriculture teacher and farmer	Rural, Northumberland County	Raw	Pulmonary mycosis or psittacosis	1:64; 1:64; 1:64; 1:128	Dairy cattle and poultry farm. Illness in 1954. Samples collected from animals now on patient's farm.	2 3 2 2 1	<1:4 1:4 1:8 1:16 1:32				
3	8	F		Rural, Union County	Pasteurized	Meningitis	1:8; 1:32	Family dog only known direct animal contact.					1	1:16
4	12	F		Urban, Columbia County	Pasteurized	Influenza	1:32	Family dog only known direct animal contact					1	1:16
5	1½	F		Rural, Northumberland County	Pasteurized and raw	Pneumonia	1:32; 1:32	Resides on small farm. Samples from animals on farm. Present cattle on premises approximately three months.	3 1	<1:4 1:8	1	1:4	2	1:16

6	3	F		Rural, Northumberland County	Pasteurized	Encephalitis with gastroenteritis	1:32; 1:64	Family dog only known direct animal contact.			1	1:16
7	1	M		Rural, Snyder County	?	Staphylococcal pneumonia, Q Fever, hypochromic anemia, cervical adenitis, nasopharyngitis	1:64	Resided on dairy farm at time of illness. Feeder cattle also in area. Family had moved when samples collected from patient's farm and three adjoining farms.	2 2 8 7 2	<1:4 1:4 1:8 1:16 1:32	1 2 1	1:16 1:32 AC*
8	34	M	Farmer	Rural, Wyoming County	Raw	Influenza	1:32; 1:32	Dairy, poultry and sheep farm. Brucellosis in dairy herd. Samples collected on patient's farm and adjoining farm.	17 11 9 3 3	<1:4 1:4 1:8 1:16 >1:32		
9	31	M	Department store salesman	Rural, Mifflin County	Pasteurized	Influenza	1:28; 1:32	Family dog only known direct contact. Frequent visits to friends residing adjacent to small abattoir in midst of dairy farm area. Whey samples from herds in this area tested (Table 5).			1	AC*

* Anticomplementary

Figure 1



LEGEND:
SERUM TESTED BY CAT—O or ●
SERUM TESTED BY CFT—□ or ■
ONE OR MORE ANIMALS IN HERD POSITIVE TO CAT or HAVING TITRE OF 1:4 OR GREATER BY CFT—● or ■
NO ANIMALS POSITIVE TO CAT OR HAVING TITRE AS 1:4 BY CFT—O or □
WHEY INDICATED, WITHIN COUNTY AREAS, AS RATIO— HERDS POSITIVE TO CAT / TOTAL HERDS TESTED

The CFT was also applied to serums from 184 cattle, six horses, and eight dogs which were randomly selected as survey controls from the general area of the human cases. Of these, a small dairy herd (11 head) in York County, Pa., with persistent undiagnosed respiratory difficulties and other signs of poor health was tested for Q fever antibodies by the CFT and also for brucellosis and leptospirosis (Leptospira pomona).

A survey of cattle serum by the capillary agglutination test (CAT) was carried out on 819 unpreserved bovine serum samples obtained from the Bureau of Animal Industry, Department of Agriculture, Harrisburg, Pa. The samples had originally been collected for routine brucellosis testing.

At time of delivery to dairy plants, composite, individual herd milk samples were obtained from 418 herds (representing approximately 7,895 cows) located in central Pennsylvania west of the Susquehanna River (Figure 1). The CAT was applied to whey samples extracted from the milk.

B. Laboratory Methods

1. Capillary Agglutination Test—The CAT was conducted in accordance with Luoto's recommendations.[26,27] Stained antigen was provided by the National Microbiological Institute, Rocky Mountain Laboratory, Hamilton, Mont. Attempts to utilize the direct agglutination test for detection of Q fever antibodies in whey[28] were unsatisfactory due to difficulties encountered in reading the results. Preparation of the whey was accomplished by the method of Stoker and Marmion.[28]

2. Complement Fixation Test—The CFT was carried out in accordance with recommendations for the diagnostic antigen (Q Fever-American Strain-Nine Mile)* which was utilized in this test. The test consisted of a "micromethod"

* Lederle.

modification of the Kolmer-Boerner test.[29-33] Separation of serum from blood samples was accomplished by centrifugation, after clot formation. The serum was prepared as recommended by Dr. Klaus Hummeler, Viral Diagnostic Laboratory of the Children's Hospital of Philadelphia. The serum was inactivated by heating at 56° C for 30 minutes. Nonspecific antibodies (Heterophile-Forssman) were removed by absorption with washed and packed sheep red blood cells. Two drops of packed sheep red cells were added to 0.6 ml of a 1:2 dilution of serum in veronal buffered saline.

Table 2—Serological Survey of Animals for Q Fever (CFT and CAT) in 28 Pennsylvania Counties

Area (County)	Type of Test	No. of Cattle Tested (Other Species Specified)	No. of Animals Negative by CAT or Titers <1:4 by CFT	No. of Animals Positive by CAT or CFT Titers 1:4 or Greater	
Alleghany	CAT	37	36	1	
Beaver	CAT	40	40	0	
Bedford	CAT	22	21	1	
Berks	CAT	40	39	1	
Blair	CAT	24	23	1	
Bucks	CAT	36	36	0	
Butler	CAT	7	7	0	
Chester	CAT	34	34	0	
	CFT	20	16	2	1:4
				1	1:8
				1	1:32
Clearfield	CAT	35	33	2	
Crawford	CAT	38	36	2	
Erie	CAT	35	35	0	
Franklin	CAT	35	33	2	
Lackawanna	CAT	33	32	1	
Lancaster	CAT	28	20	8	
	CFT	26	5	1	1:4
				3	1:8
				5	1:16
				4	1:32
				8	1:32
Lebanon	CAT	40	40	0	
Lehigh	CAT	32	30	2	
Montgomery	CAT	28	19	9	
Northumberland	CFT	14	5	3	1:4
				3	1:8
				2	1:16
				1	1:32
Philadelphia	CFT	8	1	5	1:16
				1	1:32
				1	1:32
	CFT	6 (equine)	3	1	1:4
				2	1:8
	CFT	6 (canine)	?	1	1:32
				5	AC*

* Anticomplementary

Table 2—Continued

Area (County)	Type of Test	No. of Cattle Tested (Other Species Specified)	No. of Animals Negative by CAT or Titers <1:4 by CFT	No. of Animals Positive by CAT or CFT Titers 1:4 or Greater	
Pike	CAT	30	30	0	
Potter	CAT	24	1	23	
Snyder	CFT	21	2	2	1:4
				8	1:8
				7	1:16
				2	1:32
Susquehanna	CFT	73	43	30	
Warren	CAT	39	39	0	
Washington	CAT	25	25	0	
Westmoreland	CAT	12	12	0	
Wyoming	CAT	39	16	23	
	CFT	43	17	11	1:4
				9	1:8
				3	1:16
				3	1:32
York	CAT	33	33	0	
	CFT	156	36	47	1:4
				41	1:8
				24	1:16
				2	1:32
				5	1:32
				1	AC*
	CFT	2 (canine)	0	1	1:8
				1	1:16

* Anticomplementary

Table 3—Summary of Serological Data on Animals Closely Associated with Human Q Fever Cases and Controls

CFT Titer	Survey Animals (Controls)				Animals Closely Associated with Known Human Cases			
	No. of Cattle	Approximate Per cent	No. of Equine	No. of Canine	No. of Cattle	Approximate Per cent	No. of Equine	No. of Canine
<1:4	53	28.8	3		29	28	1	
							2	
1:4	49	26.6	1		17	16.5	2	1
1:8	42	22.8	2	1	23	22	1	
1:16	29	15.8		1	17	16.5		6
1:32	3	1.6			7	6.7		2
>1:32	7	3.8		1	11	10.5		
AC*	1			5				3
Total animals	184		6	8	104		4	12

* Anticomplementary

Table 4—Summary of Q Fever Survey of Cattle by the CAT on Serums Obtained from the Bureau of Animal Industry, Harrisburg, Pa.

	Survey Animals	
	No. of Cattle	Approximate Per cent
Positive	106	13
Negative	713	87
Total animals	819	

Results

Data on nine human cases of Q fever in Pennsylvania and the results of serological studies on animals closely associated with these cases are summarized in Tables 1 and 3. Of 104 cattle, three horses, and nine dogs tested, all but 29 cattle and two dogs had CFT titers of 1:4 or above. The serums from the two dogs proved to be anticomplementary.

The results of a random survey of animal serums from 28 Pennsylvania counties, using the CFT and CAT, are summarized in Table 2 and Figure 1. The map illustrates a composite of all tests, i.e., CFT on serum and CAT on serum and whey, and includes animals tested during the trace of known human cases. Of the 1,107 individual bovine serum samples tested (Tables 2, 3, and 4), 795 were either negative to the CAT or had titers below 1:4 by the CFT. One hundred and six were positive to the CAT, 205 showed CFT titers of 1:4 or greater, and one was anticomplementary.

Of 418 herds (representing approximately 7,895 cows) surveyed by the CAT using pooled samples of milk whey in six Pennsylvania counties, 377 herds (approximately 6,955 cows) were negative and 41 herds (approximately 940 cows) were positive (Tables 5 and 6).

CFT titers for Q fever in the small York County dairy herd with signs of poor health were as follows: three less than 1:4, one 1:4, one 1:8, one 1:16, two 1:32, and three greater than 1:32. The herd was negative for brucellosis and leptospirosis (L. pomona).

Discussion

It should be noted that no attempts were made to isolate the organism or prove means of transmission. It is recognized that many avenues of investigation were left untouched. However, the study does provide some information regarding the environment of the cases investigated (Table 1). All but one of the patients lived in rural areas. Five of the cases traced showed direct

Table 5—Results of Q Fever Survey of 418 Herds (Approximately 7,895 Cows) by the CAT on Pooled Samples of Milk Whey in Six Pennsylvania Counties

Area (County)	No. of Herds Tested	No. of Herds Negative	No. of Herds Positive
Blair	12 (approx. 280 cows)	12	0
Centre	20 (" 405 cows)	12	8 (approx. 150 cows)
Huntington	78 (" 1,680 cows)	67	11 (" 305 cows)
Juniata	54 (" 690 cows)	52	2 (" 25 cows)
Mifflin	246 (" 4,715 cows)	227	19 (" 450 cows)
Snyder	8 (" 125 cows)	7	1 (" 10 cows)

Table 6—Summary of Q Fever Survey of 418 Herds by the CAT on Pooled Milk Whey Samples

Survey Animals	No. of Herds	Approximate Per cent
Positive	41 herds (approx. 940 cows)	10
Negative	377 herds (" 6,955 cows)	90
Total herds	418 herds (" 7,895 cows)	

association with domestic farm animals. Definite access to raw milk was known to have occurred in three cases. In the three cases involving young children, dogs were the only known direct animal contacts and only pasteurized milk was consumed.

The actual modes of transmission, though unknown, can probably be related to one or more of a number of factors, which have been incriminated in other studies,[1-4,7,9,10,17,18,22,26,34] i.e., aerosols arising from infected animals; contact with ticks which may have infested the dogs; proximity to dairy farms (all cases); and use of raw and/or possibly improperly pasteurized milk. Finally, we can only speculate as to the "direction" of infection, i.e., animal to man, man to animal, and animal products to man.

The serologically determined human cases of Q fever which were investigated were localized in two general areas in Pennsylvania. However, two hospitals located in these areas (Geisinger Memorial Hospital, Danville, Pa., and Children's Hospital of Philadelphia*) were particularly cognizant of the Q fever problem and were conducting tests whenever suspicious cases appeared. The existence of Q fever in other areas can only be speculated upon at present. In so far as the animals are concerned, it appears that the predominance of serologically positive animals are "percentagewise" greater in the eastern portion of the state (Table 2 and Figure 1). The reader should recognize the fact that the percentages listed in Table 3 are related to the geographic distribution of areas tested and may not be statistically valid on a state-wide basis.

Q fever is unrecognized as a clinical entity in cattle in the United States. However, a Russian paper[35] reports clinical signs in the bovine species including rhinitis, conjunctivitis, depression, anorexia, abortion, and decreased milk production. During the present survey, one small dairy herd in York County did show persistent respiratory difficulties (dyspnea and rhinorrhea), anorexia, poor general condition, and lowered milk production. There were no abortions up to the time of sampling. All but three of the animals showed CFT titers for Q fever of 1:4 or above and clinical signs were generally more significant in those animals with the highest titers. The herd was negative to leptospirosis and brucellosis. The animals tested had been on the premises for approximately seven months and represented a complete replacement of a previous herd with similar clinical signs and many "positive" Q fever titers (Viral Diagnostic Laboratory, Children's Hospital of Philadelphia). The herd's poor condition and low production were the causes for replacement. Further investigation in this direction is not within the scope of this report.

The CFT has been shown to be a sensitive and specific test for Q fever antibodies in serum.[36] CFT titers are listed without attempting to establish a demarcation line to separate possible nonspecific reactions from "true" infection. In the authors' opinion, such

* Suspicious serums from both hospitals were tested by the Viral Diagnostic Laboratory, Children's Hospital of Philadelphia.

arbitrary considerations should not be made. There is evidence indicating that the selection of high titers to assure elimination of nonspecific reactions is unreliable and that the sensitivity of the CFT for bovine serums may be accurate for the lowest titers checked, i.e., 1:4.[37] In other studies, titers of 1:5, 1:8, or 1:16 have been chosen as the lowest "positive" specific reaction.[13,18,24,28]

In man, a titer of 1:32 has been considered as a clinical level of Q fever antibodies (Viral Diagnostic Laboratory, Children's Hospital of Philadelphia). Demonstration of a rising titer is taken as evidence of active infection. In this study, the presence of the antibodies rather than a clinical level was being sought.

Results of the CAT on whey and serum show a relatively low percentage of positives. Comparative studies seem to indicate that the test is not as sensitive as the CFT in detecting Q fever antibodies in serum.[37] In addition, some preparatory procedures for whey and serum appear to decrease the sensitivity of the CAT test.[37] As composite herd milk samples were used, the specific level of antibodies in individual animals could not be assessed.

Summary

The problem of Q fever in the state of Pennsylvania was investigated by tracing documented human cases and carrying out serological tests on animals associated with these cases. In addition, a limited random survey of animals in the state was accomplished, a considerable number of cattle showing antibodies to the Q fever antigen. Serum was tested, utilizing both the complement fixation test and the capillary agglutination test. Whey from herd milk samples was tested utilizing the capillary agglutination test. Available evidence indicates that Q fever may be an important public health problem in the state of Pennsylvania. The presence of an undiagnosed acute febrile illness warrents serologic testing for Q fever antibodies. It seems likely that the appearance of human cases bears some relationship to the incidence of Q fever titers in the local cattle population.

ACKNOWLEDGMENT—The authors express their appreciation for the assistance of the following persons: Dr. Klaus Hummeler, Viral Diagnostic Laboratory, Children's Hospital of Philadelphia; Dr. Ernest J. Witte, Division of Veterinary Public Health, Department of Health, Harrisburg, Pa.; Dr. Raymond Fagan, Wyeth Laboratories, Radnor, Pa.; and Dr. William Medway, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

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Dr. Marshak is professor of veterinary medicine and chairman, Department of Applied Veterinary Medical Sciences, University of Pennsylvania, School of Veterinary Medicine, Philadelphia, Pa. Mr. Melbin and Mr. Herman were senior students at the university who worked on the study.

This study was aided by a grant from the National Institutes of Health, U. S. Public Health Service (Grant E-2509(A)).

The authors made a series of field tests to compare the effects of several chemical compounds on the sanitizing of beer glasses. The advantages and disadvantages are discussed. However, it was found that the major source of contamination was the equipment for washing beer glasses.

THE CHEMICAL SANITATION OF BEER GLASSES

E. L. Van Engel and A. E. Boyer

TO PUBLIC HEALTH DEPARTMENTS, to the average bartender, and to the brewer, the serving of a good glass of beer means three different things. To the public health departments "good" means disease free. To the bartender "good" means simplicity; any process that takes time or makes work is not good. To the brewer "good" means appealing; why spend months processing beer that, when served, will smell like chlorine or refuse to maintain a collar of foam. This is a difficult problem since there is no compound on the market or procedure that will permit a bartender to simply serve an appealing glass of beer in a positively disease free glass.

The recent introduction of trichloromelamines to beer glass sanitation gave hope for a time that maybe this problem had been solved. Preliminary laboratory tests showed trichloromelamines to have a very high degree of sanitizing power. Our own test results indicated it was comparable in effectiveness to quaternary ammonium compounds, and reports from others indicated it was a very satisfactory sanitizer. Bartenders were happy with the compound. All one had to do was to place a premeasured amount in the last rinse tank and it was all set. Moreover, it is not irritating to the user's hands; it is odorless and does not affect the drawing of an appealing glass of beer. We felt, therefore, that trichloromelamine exhibited great potential as a beer glass sanitizing agent.

Rather than base all our conclusions on laboratory analyses, we decided to run an extensive series of field tests, similar to those of Mallmann and Kahler (1949). To a large extent, the decision to run field tests was based on one variable—the contact time between glass and sanitizer. In laboratory tests, such as those of Weber and Black (1948) and Chambers (1956), the time factor is very closely controlled and usually relatively long. In actual practice, the bartender considers this contact time as a short necessity and the shorter the better. Therefore, we felt that field testing would give us a better idea of the true effectiveness of the compounds we were checking.

Materials and Methods

Sanitizing Agents Tested

Four general sanitizing agents were tested. Chloromelamine, chloramine T, a quaternary ammonium compound (alkyldimethylbenzylammonium chloride)

and hypochlorite. In addition an iodoform product was tested as a detergent sanitizer.

Bar Facilities

In field testing these sanitizing agents, we were fortunate in being able to closely control almost all of the usual variables. All samples were taken from glasses washed at one specific bar where only beer was served. The bar was equipped with a three compartment stainless steel sink and drainboard. When two compartment sink tests were run, one of the sinks was left dry. Each sink had a four-gallon capacity. All of the glasses, 8-oz scham glasses, were brushed in the first sink with a motor driven glass washer. Only one bartender participated in the entire series of tests, but it was the action of this bartender that resulted in the biggest variable of the tests—the contact time between glass and solution. Although a period of several minutes contact time is recommended by the Milwaukee Health Department, the actual contact time involved was a few seconds. It is a general practice among bartenders, in making their work as easy as possible, to simply pass the glasses they are washing quickly through the solutions.

Sampling Procedures

Each series of tests was made over a weekly period. Swab samples were only taken from glasses that had been in use on the day the swabs were taken. Six-inch cotton swabs immersed in 4 ml of neutralizing buffer (Difco) were used in making the tests. Each glass was sampled by rubbing one swab five times around the inside and five times around the outside top quarter inch area of the glass.

Swab samples were also taken from four square inch areas of the sinks and drainboard; and from various parts of the glass washer. These samples were taken once a week, in the morning before the equipment was put to use.

Table 1—The Comparative Growth of Contaminants Incubated at 28° C and at 35° C

Sanitizing Agent	Glasses Sampled	Incubation Temperature	Per cent Having Less Than 100 Organisms Glass
Trichloromelamine	30	28° C	0
"	30	35° C*	13.3

* Plate incubated at 35° C had generally lower counts.

Laboratory Procedures

Prior to plating, each swab was shaken vigorously 25 times. The plates were incubated for 48 hours at 28° C. Since comparison growth tests (Table 1) showed a better growth of contaminants at 28° C than at 35° C, an incubation temperature of 28° C was used.

The available chlorine content was determined by titration with sodium thiosulfate, and the quaternary ammonium compound was tested with p Hydrion QT test paper.

The two major contaminating organisms were identified according to the outline in Bergey's Manual of Determinative Bacteriology (1957).

Results

An extensive series of field tests were made with four sanitizing agents. They were found to have the following order of increasing effectiveness: trichloromelamine, chloramine T, a quaternary ammonium compound (alkyldimethylbenzylammonium chloride) and hypochlorite (Tables 2 and 3). A contamination rate of 100 organisms per glass was used as a basis for acceptance or rejection. Counts over 100 were con-

sidered unsatisfactory and counts below 100 were considered satisfactory. This is the rejection or acceptance rate used by the city of Milwaukee Health Department.

Our results indicate that good correlation between laboratory test results and field test results does not always exist. According to Kubista (1949), who used a modified Chambers test procedure, of four trichloromelamine compounds tested, three were satisfactory, and of 16 chloramine T compounds tested, none were satisfactory. Our results showed chloramine T to be superior to trichloromelamine. However, neither were as satisfactory as the quaternary or the hypochlorite.

A comparison of the effectiveness of the tested compounds was made using two and three compartment sinks. These results showed that when using trichloromelamine or chloramine T, the three compartment sink is superior. The effectiveness of the two compounds dropped from 58 per cent to 1.6 per cent and

Table 2—The Comparative Effect of Chemical Sanitizers Using a Three Compartment Sink*

Sink No. 1	Sink No. 3	Recommended Chemical Concentration	ppm Available Cl or Quat	Glasses Sampled	Per cent Having Less Than 100 Organisms/ Glass
Recommended compatible detergent	Trichloromelamine	2.4 gm/3 gal	38	55	58.0
"	Chloramine T	⅔ oz/gal	238	60	73.3
"	Quaternary	1 oz/4 gal	200	48	83.3
"	Hypochlorite	1 HTH Tablet/4 gal	217	48	100.0

* Sink No. 2 contained rinse water.

Table 3—The Comparative Effect of Chemical Sanitizers Using a Two Compartment Sink

Sink No. 1	Sink No. 2	Recommended Chemical Concentration	ppm Available Cl or Quat	Glasses Sampled	Per cent Having Less Than 100 Organisms/ Glass
Recommended compatible detergent	Trichloromelamine	2.4 gm/3 gal	42	60	1.6
Iodoform*	"	2.4 gm/3 gal	38	36	61.0
Recommended compatible detergent	Chloramine T	⅔ oz/gal	278	60	30.0
"	Quaternary	1 oz/4 gal	200	11†	90.9
"	Hypochlorite	1 HTH Tablet/4 gal	203	48	100.0

* 2½ oz/4 gal produced a strong iodine odor.
† Tested only one day because of marked effect on foam retention.

Table 4—Organisms per Square Inch of Bar Equipment

Sanitizer Used	Glass Washer	Sink No. 1	Sink No. 2	Sink No. 3	Drainboard
Trichloromelamine	TMTC*	TMTC	TMTC	0	TMTC
Chloramine T	"	"	"	0	12-16
Quaternary	"	"	"	0	0-4
Hypochlorite	"	"	"	0	0

* TMTC = too many to count.

from 73.3 per cent to 30 per cent, respectively. However, when trichloromelamine was used in conjunction with a detergent sanitizer (an iodoform compound) in the first tank of a two tank system, the effectiveness of the system increased from 1.6 per cent to 61.0 per cent. Whether two or three sinks were used the quaternary showed little difference in killing powers, 83.3 per cent vs 90.9 per cent; but when using a two sink system, the quaternary exhibited marked interference with beer foam retention. This effect of quaternaries on beer foam was previously demonstrated by Bishop, et al. (1951), and others.

Hypochlorite proved to be the best sanitizer tested, giving 100 per cent satisfactory results with both two and three compartment sinks. The main objection to hypochlorite is the chlorine odor which clings to the outside area of the glass after it is washed and filled.

Swab tests made on the bar equipment (Table 4) show that the major source of glass contamination is this equipment. The same organisms found here were those that were present on the glasses. The two major contaminants were identified as Escherichia intermedium and a Flavobacterium sp. To determine if the high counts on the glasses found during the testing of the trichloromelamine was caused by a reinfection from the drainboard, we ran a series of tests using a sterile drainboard (Table 5). These results show that the contamination picked up in the first tanks was not significantly reduced by the trichloromelamine, and that reinfection from the drainboard in this case was not an important factor.

Discussion

The satisfactory washing of beer glasses, because of different viewpoints involved, presents a number of problems. The health departments are generally concerned with sanitation. The Milwaukee Health Department recommends for two compartment sinks: (1) hot water at a temperature of 170° F, (2) 200 ppm of hypochlorite, or (3) 150 ppm of a quaternary ammonium compound. For three compartment sinks, in addition to the above, they recommend the use of (4) 200 ppm chloramine T or (5) 200 ppm trichloromela-

Table 5—The Analysis of Washed Glasses Placed on a Sterile Drainboard

Sanitizing Agent	Glasses Sampled	Drainboard	Per cent Having Less Than 100 Organisms/Glass
Trichloromelamine	30	Bar	0.0
"	30	Sterile	13.3*

* Counts from glasses placed on a sterile drainboard were generally lower.

mine. Since very few bars have hot water for sanitizing their utensils, most must rely on the chemicals. In all cases, the health department recommends a two-minute exposure time between solution and glass.

Bartenders, being interested in simplicity of operation, just do not, as a rule, give their beer glasses a two-minute soaking in the sanitizing solution. Two seconds would be more accurate. We have found that this extremely short contact time has a marked affect on results obtained with two of the chemical sanitizing agents tested. Trichloromelamine and chloramine T in both the two and three tank systems were very ineffective. The results were particularly bad in the two tank systems, probably because of a carry-over of detergent from the first tank which may have interfered with the action of the sanitizer, even though in all cases, recommended compatible detergents were used, and possibly by the lack of any count dilution brought about by a middle tank of rinse water.

In testing the quaternary ammonium compound and the hypochlorite, we found that the very short contact time involved was probably of very little importance. The hypochlorite gave 100 per cent results and the quaternary gave from 83 per cent to 90 per cent satisfactory results. From an ease of handling and a sanitization point of view, these products are satisfactory; however, they also have drawbacks. Quaternaries exhibit a marked effect on beer foam retention and hypochlorite leaves an undesirable chlorine odor on the washed glass, both factors can and do reduce general appeal. Little can be done about the effect quaternaries now have on foam retention, although new formulations may solve this problem; however, the offensive chlorine odor left on the beer glass by hypochlorite can be elimininated when filling the glass by letting a small amount of beer foam run over the outside surface of the glass. This, however, would probably be rejected by most bartenders, since a certain amount of beer loss would be involved. In general, it can be said that the sanitizing agent with the greatest potential and superiority over the other compounds tested is hypochlorite. Its superiority to quaternaries has been shown before by Shere (1948).

In comparing our results with those of Mallmann and Kahler (1947), one very important similarity was found. That is, that the use of a detergent sanitizer in the first sink of a two or even three sink system will give a more desirable end result. They found that by using a quaternary in the last sink and a chloramine T in the first sink the sanitizing effectiveness jumped to 92 per cent from 50 per cent when a quaternary was used alone, and that by using chloramine T in both tanks the sanitizing effectiveness rose to 85 per cent from 0 per cent when chloramine T was used alone. We found that when we used an iodoform detergent in the first sink and trichloromelamine in the second sink of a two tank system, the sanitizing effectiveness increased from 1.6 per cent to 61 per cent over the use of trichloromelamine alone. Since the major source of general glass contamination is the equipment that is being used, i.e., the brushes and sinks, the use of a sanitizing detergent in the first tank with the brushes will greatly reduce this source of contamination. The use of a sanitizer detergent in the first tank will also reduce the possibility of carrying pathogens through the solutions on the glasses, since the contact time between the glass and sanitizing solutions will be prolonged.

In September, 1958, the Milwaukee Brewers Association published a "Beer Glass Cleaning Manual," which recommends for cleaning beer glasses the use of a chloramine T detergent sanitizer in the first tank of a two or three

tank system, in combination with a chloramine T sanitizer in the last tank. This appears at this time to be a sound recommendation. Eventually, however, there will probably develop an application such as this which will solve all beer glass sanitizing problems and satisfy all the parties concerned.

Summary

A series of field tests were made comparing the beer glass sanitizing effect of trichloromelamine, chloramine T, a quaternary ammonium compound, and hypochlorite. When used alone, trichloromelamine and chloramine T are not satisfactory as beer glass sanitizers, particularly if a two compartment sink is being used. In general, better results were obtained when a three compartment sink was used. Quaternary ammonium compounds are not ideal beer glass sanitizing agents since they may have an adverse effect on beer foam retention. The most effective sanitizer tested was hypochlorite, which also has a disadvantage in that it leaves an objectionable chlorine odor on the beer glass.

The major source of general beer glass contamination was found to be equipment for washing the beer glass. Therefore, by using a detergent sanitizer in the first tank of the glass washing sinks, as well as a sanitizer in the last tank, much more satisfactory sanitizing results can be obtained, and the subsequent possibility of carrying pathogens through the solutions is greatly reduced.

ACKNOWLEDGMENT—The authors wish to thank Mr. David E. Barry and Mr. Everett A. Schunk of the city of Milwaukee Health Department for their aid in the preparation of this paper, and Mr. Ernest Victorson for his help with the field testing program.

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Journal of Public Health

EDITORIALS

Population, Family Planning, and Public Health

THE APHA Policy Resolution on Population was intended to provide guidance in this important field so that action might be taken at various levels of public health organization. Yet a realistic appraisal of the current scene clearly reveals a number of problems that must be faced if progress is to be achieved.

For one thing, resources concerned with family planning are very limited. Requests for help and materials on family planning programs have been coming in increasing numbers to the Planned Parenthood Federation of America not only from state and county health officers in the United States, but also from health officers in countries whose governments are officially committed to family planning programs. With the limited budget of a voluntary health organization, however, it can be imagined that these requests cannot possibly be handled in a manner adequate to the need. It is as if all requests for help concerning tuberculosis poured into the National Tuberculosis Association with public and voluntary hospitals refusing to give services, and public health facilities at all levels (from the local to the national) silent on the problem of tuberculosis.

Furthermore, evidence is mounting that social workers are increasingly aware of the problem and are asking for official clearance in meeting the problem. The April, 1961, issue of the Journal of Social Work contains three articles on the importance of family planning, and one review article in this field. Yet departments of public welfare all over the United States continue to insist on regulations—written or unwritten—that social workers may not even mention family planning to their clients.

Evidence is also at hand that the major Protestant groups are joined and firm in their demand that family planning services shall be made available to members of their denominations. Some Catholic spokesmen appear equally determined that such services shall not be incorporated in public health and welfare programs. This may well cause community conflicts in various parts of the country. Such conflicts cannot fail to be harmful to all concerned—to clients, to the public image of family planning, and to the public health programs themselves.

The question that faces us is this: How to achieve the ends of APHA policy and yet avoid explosive conflicts? Behind this question are others that loom on the horizon, and which must receive answers if we are to act on a rational basis. Moreover, the resources of a voluntary health organization cannot possibly suffice to deal with these problems. For instance:

1. Where in a public health program does family planning belong?

2. Does the answer to this question rest partially on the kinds of methods that public health services might be expected to offer? If it does, then what kind of research should be set up (and who will do it) to determine the methods suitable in public health programs?

3. Which of the ten methods now available are best adapted to the cultural needs of particular populations? Tietze, et al. (Family Planning Service in Rural Puerto Rico, American Journal of Obstetrics and Gynecology 81:174-182, 1961), have shown that in rural Puerto Rico with a diversity of conventional methods, including the most complex and the simplest, 1,097 couples over a total of 21,000 months of exposure reduced their pregnancy rate from a previous 83 per 100 years of exposure to 43 per 100 years of exposure—a drop of nearly 50 per cent. From a public health viewpoint, this is a large drop indeed.

4. In these terms, what are the similarities and the differences in the approaches regarding family planning that might be made to such diverse cultural groups as the families of West Virginia coal miners, of American Indians on reservations, migrant workers of Hispanic background—and inhabitants of small agricultural villages in India and Pakistan?

5. A single large group of the population in the United States and in many areas of the world—the Roman Catholics—is limited by religious doctrine to a single method of family planning. In terms of effectiveness, this method is ranked at the same level as several of the other available methods. Surely intensive research should be conducted toward the improvement of this method which, if perfected, might also prove highly acceptable to many people who now use appliance—chemical methods and dislike them. Yet little or no effective research is being conducted in this area, nor are rhythm clinics being established in tax-supported services.

6. Finally, how can we break the conspiracy of silence that surrounds this major public health problem, and still preserve the integrity of religious belief in this country? Because until this wall of silence is torn down, we can hardly arrive at answers to any of the questions posed above nor to any of the many others that present themselves.

What nongovernmental or governmental agency could be persuaded to take a necessary first step, namely, to carry out a nation-wide survey to find out where and how pregnancy regulating services are now being given in the United States? If Planned Parenthood Federation of America were to do this, they would be suspected of ex parte motivations—and furthermore, they do not have the necessary facilities to carry out such an endeavor. Yet, until we find out, we will not have the basic knowledge needed to take any next steps.

Hazards of Hospitality

THE conference on alcohol and traffic safety in Pittsburgh last May posed a fearful dilemma for health education. On the one hand, it is generally conceded that the lubricant effects of a beverage in a convivial gathering wear away the edges of hostility and facilitate the exchange of information, sym-

pathy, and understanding of the common biological condition of man. On the other hand, the investigators most critical of research on the subject, conceding that the data and the experimental designs and performances left much to be desired, emphasized that all evidence points to the conclusion that as little as 0.05 per cent alcohol in the bloodstream, roughly the effect of a single stiff drink, is sufficient to impair performance at the wheel of a car. (The current legal tolerance in many states is 0.15.) Moreover, it was asserted that highway accidents result as much from social drinking as from the activities of the perpetual souse.

How to weave one's way out of this dilemma is a question both for host and guest. Assuming that group dynamics dictate that people continue to gather at the bar, what behavioral changes are indicated? What alterations should be proposed for the structured institutional setting? Will it suffice for each guest to take a Scout's oath to touch no more than one glass per hour, so as to allow the metabolic process due time, and to drive a car only if an hour has elapsed since the last rationed drink? If it is asking too much of human responsibility to impose such self-discipline, the alternative would seem to be a Recommended Sanitary Code for Hosts. The task force that seeks to draft the code would of course recognize that the host rarely operates under ideal laboratory conditions.

It is impractical for the ordinary host to check the basal metabolism of each guest before asking whether he prefers Scotch or Bourbon. But the conscientious host might, with some incidental economy, observe the following regulations:

1. Frustrate the guest who offers to pour his own. Hand him an album of family pictures to study.

2. Ration a maximum of one ounce of alcohol per hour per 150 pounds of guest, using a graduate or a precise jigger and a time chart.

3. Provide cheese or other food to go with the drinks. And press the food on guests, instead of pressing drinks. The cleaning bill will be modest.

4. Offer a liberal assortment of nonalcoholic drinks, especially those that look like highballs or cocktails. But do so surreptitiously, so as to permit guests who prefer them to take fruit juices or soda waters without feeling antisocial or inferior. Also set them out for the taking. Only confirmed *bibulophiles* will know the difference.

5. Insure that no guest drives away before he has had time to burn up his last dram. Fascinate him with tales of India. Ply him with avocado salad. Or, if he is insistent, beguile him with your teen-age daughters. Invent a social code that it is impolite to leave within 60 minutes after drinking.

These are fairly simple rules to follow. All that is needed to enforce them is a sanitarian lurking behind every drapery.

(The Journal is indebted to Marcus Rosenblum, editor, Public Health Reports, Washington, D. C., for the above editorial.)

TO THE EDITOR:

Public Health and Community Health

"Community Health—Challenge and Opportunity" by Malcolm H. Merrill, a feature article which appeared in the March, 1961, issue of the Journal, and an editorial, "The Vocabulary of Health," in the February, 1961, issue call to one's attention the need for consideration of the meaning and usage of the words "community" and "public" in association with the word "health."

No criticism of Dr. Merrill's statements is intended, but since his article is current, it does help to point up the importance of considering the use of the word "community" in preference to "public" whenever possible.

While it does not seem necessary here to review the meaning of the word "health" or the term "public health," it does seem important to all who may be engaged as workers in the health professions or allied fields to know the meaning and to consider appropriate application of such words as community and public in connection with the word health.

Perhaps the term "public health" has been, is, or can be overused by public health workers, and at times to the detriment of public health as a field of endeavor or engagement. In other words, overuse of the term public health might sometimes mean bad "public relations."

In definitions of public health, it is common to state the attaining of its objectives thus: "through organized community efforts," and that public health's justification, or responsibility is for community benefit.[1]

Turning to the dictionary[2] for help, the word public may be used either as an adjective or as a noun, while community is commonly considered to be a noun. Used as an adjective, public as contrasted to private usually is assumed to refer to people, or relates something as "belonging to, or affecting a nation, state, or community at large." It may also denote something of common ownership (public property) or open to all (a public meeting), or it may mean "engaged in activities, especially unofficial activities, carried on for or before the public; as men in public life." This connotation may suggest having to do with "politics." The definition, "open to the knowledge or view of all; generally seen, known or heard," when we think of services rendered recipients of health department clinics or medical care programs might suggest a lack of privacy or confidentiality. Neither of the latter two impressions which might inaptly be applied to public health departments, or public health workers, would likely promote good public relations.

The adjective definition of public, "having a civil or official status representing the public; . . ." would perhaps more aptly apply to official agencies or departments of public health, but might not always be for favorable public opinion. To quote Hanlon: "Particular difficulties arise from the fact that public health programs are in large part activities of official governmental agencies and therefore subject to all of the attitudes which the public and community groups have toward government. Generally speaking, public employment has been held in low esteem in the U. S. . . ."[3]

Applying the dictionary noun definition of public, "the general body of mankind, or of a nation, state, or community; the people, indefinitely; as, the American public; also a particular body of people; as the reading public. . . ." While community is included by this

definition, would it not seem generally more applicable to use public when referring to official international or national agencies of health, or to state health departments. This recalls the theme of the 87th Annual Meeting of the APHA with all that the theme includes: "Public Health Is One World."

Defining community by the dictionary includes: "(1) a body of people having common organization or interests or living in the same place under the same laws; . . . (2) society at large; the people in general; restrictedly, the people of a particular region, or the region itself; . . . (3) joint ownership or participation; . . . (4) common character likeness. . . ."

Throughout literature on public health administration and practice, it seems more often that the word community is used with reference to more local thinking, i.e., "local health departments," or "community health departments," community health programs, and so forth. This seems to be for the most part the sense of meaning which Dr. Merrill is conveying in his article with reference to community health. [To quote Dr. Merrill, page 359, ". . . I choose 'community health—challenge and opportunity' because I feel so strongly that the solid advances in public health are to be made through local organization and local efforts. It is in the community that effective measures will be developed for protecting and promoting health, and it is at the community level that new scientific knowledge will be applied and new knowledge gained in the application. . . ."]

The use of the word community when referring to local health departments, their programs, and activities is perhaps more justifiable because the smaller the geographical area of responsibility or the smaller population component of a community or "state," the more factors and characteristics one should expect to find in common in that community among its population. With respect to "common interests" of the population, this would seem to be greater the smaller the community unit. However, this does appear to be a debatable point.

Leavell and Clark have put it this way: "The community has been called a group of people living in physical proximity who have certain basic things in common. The word 'community' is also used in a broader sense referring to the state, national or international communities which have certain basic things in common, but lack the element of physical proximity. . . ."[4]

Smillie says, "Public health protection in the United States has developed on a community basis. First, the community met each individual situation as it arose; then gradually, permanent local health organizations were formed. The state did not consider health protection to be an essential state-wide governmental function, and no state health work was organized until the nation was nearly 100 years old. . . ."[1]

In summation, it would seem for psychologic reasons that the word, community, might be used more often in preference to the word, public, whenever or wherever the word community might apply. There is perhaps a need for more discretion in the usage of the word, public, by public health personnel in connection with health departments, their activities or programs; and in discussions, labels, or manuscripts.

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To the Editor

Microbial Aerosols in Airborne Infection

The airborne route as a mode of transmission of infectious agents has been the subject of increasing study and epidemiological consideration in recent years.[1] Ample evidence exists to indicate that in nature this route plays a major role in a number of infectious diseases of man and a secondary role in many others. An even wider array of infectious agents may be transmitted by this route when they become airborne as a consequence of laboratory accidents, industrial or agricultural handling of contaminated substances, or intentional dispersion. In view of this increased interest and the broadened horizons of study of airborne infection it is appropriate at this time to examine the adequacy of certain terms widely used in this field.

The airborne mode of transmission is divided into two major categories, droplet nuclei and dusts, by an authoritative and widely quoted report.[2]

Droplet nuclei are considered to be the small residues which result from the evaporation of droplets (spray emanating from an infected person during sneezing, coughing, singing, or talking) and remain suspended in the air of enclosed spaces for relatively long periods of time. It is also recognized that droplet nuclei may be created purposely by atomizing devices or accidentally in the course of laboratory procedures.

Dusts are considered to be the coarser particles which may arise from contaminated floors, clothes, bedding or other articles, or from soil, and ordinarily remain suspended in the air for relatively short periods of time.

A number of situations are inadequately recognized by these terms. For example:

(a) Source of droplets other than spray emanating from an infected person —such as droplets resulting from handling infected animal tissue on farms, in abattoirs, or in rendering plants.

(b) Dusts which are not the "coarser particles" as defined above. Finely divided dusts may be the source of airborne infectious agents as a result of accidentally breaking containers of freeze-dried organisms, dispersion of organisms contaminating wool, goat hair, or cotton during industrial processing of these materials, and intentional dissemination of freeze-dried, live, attenuated organisms for the purpose of aerogenic immunization.

(c) An airborne particle of small size (10 microns or less in diameter) very rapidly comes to equilibrium with the atmosphere into which it has been disseminated. The conditions of equilibrium are identical irrespective of whether the particle was originally a liquid droplet or in the solid state. Important factors in determining this equilibrium are the amount and identity of chemical substances in the particle, as well as the temperature and vapor tension of water in the atmosphere. Thus, when liquid droplets consisting of organisms suspended in a proteinaceous solution are dispersed in air they may remain in the liquid state or evaporate to solid residues dependent upon the relative humidity of the atmosphere. Similarly, solid particles consisting of organisms dried from a proteinaceous medium will, depending upon the relative humidity of the air into which they are dispersed, either remain in the solid state or absorb enough water to become liquid droplets.

(d) As usually defined, droplet nuclei are considered primarily as intramural phenomena. It is important to recognize, in addition, that particulate matter of small size (e.g., 10 micron diameter) will, under normal conditions of atmospheric turbulence, stay suspended almost indefinitely and may travel extramurally downwind for considerable distances. For example, epidemiological observations in a recent epidemic of Q

fever are consistent with airborne travel of Coxiella burnetii for distances up to 10 miles.[3] Indeed, as exemplified by investigations of airborne travel of plant pathogens as well as of nonliving particles, travel of many hundreds or even thousands of miles is demonstrable.

It is recommended that the term microbial aerosol be adopted to define suspensions in air of particles consisting partially or wholly of microorganisms—such suspensions representing the means by which airborne infection is transmitted. An upper limit of particle diameter may somewhat arbitrarily be set at 100 microns. The lower limit of particle size for such aerosols presents no difficulty since it would be determined by the unitary size of the smallest known microorganism (10 millimicrons). It is evident that the term microbial aerosol includes all the concepts now encompassed by the terms droplet nuclei and dusts as well as many additional concepts important in microbiology and public health but inadequately included or completely neglected in current terminology.

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Journals Wanted

If there are any readers who have no further need of their October, 1960, Journals, the Association would be grateful if these would be mailed to Association headquarters at 1790 Broadway, New York 19, N. Y.

ASSOCIATION NEWS

APHA ANNUAL MEETINGS

1961—November 13-November 17—Detroit, Mich.

1962—October 15-19—Miami Beach, Fla.

APHA Sends Greetings Abroad

Betty W. Bond, Ph.D., M.P.H., member of the APHA Executive Board and chief, Health Education Services, Minneapolis (Minn.) Health Department, brought the official greetings of the APHA to the members of the Canadian Public Health Association which met June 6-8 this year in Regina, Province of Saskatchewan. William J. Zukel, M.D., chief, Technical Services Branch, National Heart Institute, Bethesda, Md., brought similar good wishes to the Royal Society of Health which held its 68th Health Congress this year in Blackpool, April 24-28. ("Papers for Discussion in Sections and Conferences" at the congress are published by the RSH, 90 Buckingham Palace Road, London, S.W.1; 177 pages; £1. The sections were on family health and welfare, food and nutrition, health education, hospitals, housing, mental health, occupational health, preventive medicine, radiation, veterinary hygiene, and world health. The conferences were for domiciliary nurses and midwives, health visitors, municipal engineers, public health inspectors, and social workers.)

Request for Reports of Infections

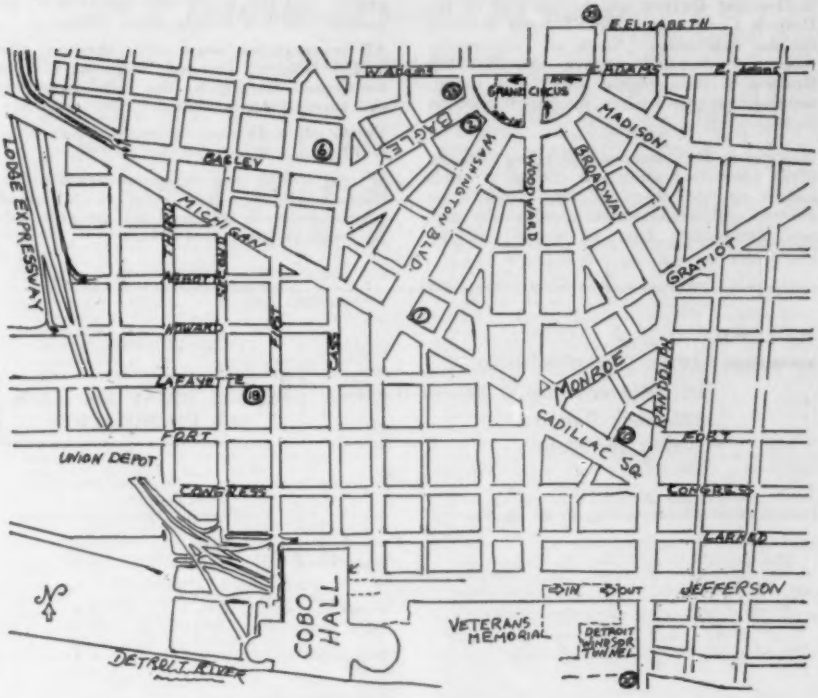
In order that a permanent Committee on Laboratory Infections and Accidents of the APHA Laboratory Section may more effectively carry out its activities, it is requested that instances of laboratory-acquired infection, particularly those occurring within the last ten years, be reported to this committee. As much information as possible about each case is desirable, such as type of work involved, probable mode of infection, the agent, the type of disease, the manner in which the diagnosis was confirmed, the outcome of the infection, and the type of personnel involved. If so desired, the information provided will remain anonymous. If the case has been published, the reference should be indicated.

Information should be sent to the chairman of the committee, Dr. S. Edward Sulkin, Department of Microbiology, The University of Texas Southwestern Medical School, Dallas.

New Western Office Staff Member

Nicholas Parlette, M.P.H., formerly health education consultant, Division of Alcoholic Rehabilitation, California State Department of Public Health, has been appointed lecturer in the School of Public Health, University of California, Berkeley, to be detailed to the Western Regional Office, Western Branch Executive Office, American Public Health Association. Mr. Parlette holds the title of education associate on the staff of the Western Regional Office, and will devote his full-time effort to development of programs in continuing education.

Street Plan of Detroit Showing Location of Cobo Hall and Housing Bureau Hotels (Number indicates location on map.)



HOTELS AND RATES

Index to Map	Hotel	Single	Double	Twin Beds	Parlor Suite
6	Detroit-Leland ..... Cass & Bagley Sts.	$7.50-13.50	$10.50-16.00	$12.00-19.00	$25.00-35.00
10	Henrose ..... Cadillac Square & Bates St.	6.50-10.50	9.00-13.50	12.50-16.00	25.00-45.00
18	Pick-Fort Shelby ..... 525 Lafayette St.	6.00-12.75	9.00-15.50	10.50-16.25	23.00-43.50
20	Prince Edward ..... Windsor, Ontario	6.50- 8.50	9.50-11.50	11.50-12.00	21.00-25.00
1	Sheraton-Cadillac ..... 1114 Washington Blvd.	8.50-18.00	14.35-20.50	14.85-23.00	29.00-37.50
2	Statler-Hilton ..... 1539 Washington Blvd.	7.00-13.50	12.50-17.00	14.00-24.50	29.00-44.00
23	Tuller ..... Park and Adams Sts.	5.00- 9.00	9.00-12.00	10.50-15.00	25.00
25	Wolverine ..... Witherell and Elizabeth Sts.	6.00- 9.00	8.50-10.00	11.00-18.50	25.00

DETROIT ANNUAL MEETING, NOVEMBER 13-17

A Housing Bureau will be operated by the **Detroit Convention and Tourist Bureau** for the Association. Since all requests for rooms are handled through the **Housing Bureau** in chronological order, it is recommended that you send in your application as soon as possible.

In making hotel reservations please use the blank below, indicating four choices of hotels and a specific range in rates from those quoted. All requests must give definite date and approximate hour of arrival and departure and the names and addresses of all persons who will occupy rooms requested.

All reservations must clear through the APHA Housing Bureau. Requests will be confirmed directly by the hotel in which the reservation is placed.

Hotels will hold room reservations only until **6:00 p.m.**, unless otherwise specified.

If you would like accommodations in a Detroit Hotel other than those listed please indicate this and an attempt will be made to place you there.

MAIL TO:

APHA HOUSING BUREAU
Detroit Convention & Tourist Bureau
626 Book Building
Detroit 26, Mich.

PLEASE PRINT OR TYPE ALL INFORMATION

PLEASE MAKE RESERVATIONS NOTED BELOW: (Please indicate rate range.)

First Choice ..... Single Room .....From $..... to $.....

Second Choice ..... Double Bedroom .....From $..... to $.....

Third Choice ..... Twin Bedroom .....From $..... to $.....

Fourth Choice ..... Parlor/Bedroom Suite..From $..... to $.....

ARRIVAL DATE ....., HOUR.....A.M.....P.M..... DEPARTURE DATE.....

If reservation cannot be made in one of the hotels indicated, shall we place you elsewhere? Yes..... No.....

NAMES OF ALL OCCUPANTS
(Please bracket those sharing a room)

ADDRESSES

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Confirm reservation to: .....

Address:.....
(Street) (City) (Zone) (State)

NEWS OF AFFILIATED SOCIETIES AND BRANCHES

APHA Affiliated Societies and Branches

Society and Secretary

ALABAMA PUBLIC HEALTH ASSOCIATION, Dr. Allen N. Koplin, 1005 S. 16th St., Birmingham
ARIZONA PUBLIC HEALTH ASSOCIATION, Catharine Weiser, Supervisor of Public Health Nurses, Pima County Health Department, Tucson
ARKANSAS PUBLIC HEALTH ASSOCIATION, Mrs. Vada Russell, State Health Dept. Bldg., Little Rock
CALIFORNIA, NORTHERN PUBLIC HEALTH ASSOCIATION, Mrs. Joan Davis, City Health Dept., San Jose
CALIFORNIA, SOUTHERN, PUBLIC HEALTH ASSOCIATION, Dorothea Hansen, City Health Dept., Los Angeles 12
COLORADO PUBLIC HEALTH ASSOCIATION, Mrs. Nevin Kilpatrick, 2228 Jasmine, Denver 7
CONNECTICUT PUBLIC HEALTH ASSOCIATION, Mrs. Shirley T. Steidel, R.N., VNA, 28 S. Main St., West Hartford
CUBAN PUBLIC HEALTH SOCIETY, Dr. Raphael Calvo Fonseca, Calle 19 No. 511 Altos Vedado, Havana
FLORIDA PUBLIC HEALTH ASSOCIATION, Everett H. Williams, Jr., P. O. Box 210, Jacksonville
GEORGIA PUBLIC HEALTH ASSOCIATION, Mrs. Martha Power, State Health Dept., Atlanta 3
HAWAII PUBLIC HEALTH ASSOCIATION, Mr. Mapuana P. McComas, 1018 Lunalilo Street, Honolulu
IDAHO PUBLIC HEALTH ASSOCIATION, Ralph Carpenter, 120 N. Capitol Blvd., Boise
ILLINOIS PUBLIC HEALTH ASSOCIATION, William J. Hixon, Evanston Health Dept., Evanston
INDIANA PUBLIC HEALTH ASSOCIATION, Malcolm J. McLelland, State Board of Health, Indianapolis 7
IOWA PUBLIC HEALTH ASSOCIATION, Lloyd Coe, Iowa Hospital Association, 1012 Liberty Bldg., Des Moines
KANSAS PUBLIC HEALTH ASSOCIATION, W. W. Wilmore, Kansas Tuberculosis and Health Assn., 1134 Topeka Ave., Topeka
KENTUCKY PUBLIC HEALTH ASSOCIATION, Peggy Fisher, 275 E. Main St., Frankfort
LOUISIANA PUBLIC HEALTH ASSOCIATION, George M. Ineichen, P. O. Box 1872, Monroe
MARYLAND PUBLIC HEALTH ASSOCIATION, C. Murray Wylie, M.D., 615 North Wolfe St., Baltimore 5, Md.
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION, Mrs. Elisabeth K. Cass, Dept. of Health, Cambridge
MICHIGAN PUBLIC HEALTH ASSOCIATION, Howard Hilton, Washtenaw County Health Dept., County Bldg. Ann Arbor
MINNESOTA PUBLIC HEALTH ASSOCIATION, D. S. Fleming, M.D., State Dept. of Health, University Campus, Minneapolis
MISSISSIPPI PUBLIC HEALTH ASSOCIATION, V. T. Hawkins, State Board of Health, Jackson
MISSOURI PUBLIC HEALTH ASSOCIATION, Mrs. Nadia Craver, 5th Fl., State Office Bldg., Jefferson City
MONTANA PUBLIC HEALTH ASSOCIATION, Mrs. Lou Esmay, City-County Health Dept., Great Falls
NEBRASKA PUBLIC HEALTH ASSOCIATION, Mrs. Jack Carey, Lincoln Dairy Council, 620 Sharp Bldg., Lincoln
NEVADA PUBLIC HEALTH ASSOCIATION, Mrs. Elaine Walbroek, 101 W. Arroya, Reno
NEW JERSEY PUBLIC HEALTH ASSOCIATION, William J. Chamberlain, 118 W. State St., Trenton 8
NEW MEXICO PUBLIC HEALTH ASSOCIATION, Mrs. Mary Gilliland, State Dept. of Public Health, Santa Fe
NEW YORK CITY, PUBLIC HEALTH ASSOCIATION OF, Frances Ann McVey, 4317 Robinson St., Flushing 55, N. Y.
NEW YORK STATE PUBLIC HEALTH ASSOCIATION, Carline Millican, Rochester Regional Office, State Health Dept., Rochester
NORTH CAROLINA PUBLIC HEALTH ASSOCIATION, Robert W. Brown, Box 7525, Asheville
NORTH DAKOTA PUBLIC HEALTH ASSOCIATION, George E. Michaelson, P. O. Box 325, Bismarck
OHIO PUBLIC HEALTH ASSOCIATION, Mrs. June O'Donnell, 3516 Braddock St., Dayton
OKLAHOMA PUBLIC HEALTH ASSOCIATION, Bill Burk, 3400 North Eastern, Oklahoma City
OREGON PUBLIC HEALTH ASSOCIATION, Muriel David, City Bureau of Health, 203 N.E. 29th Ave., Portland
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION, Emma J. Petach, R.N., 324 N. Second St., Harrisburg
PUERTO RICO PUBLIC HEALTH ASSOCIATION, Mrs. Mae de Acin, Apartado 211, San Juan 2
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION, Emily Anne Easterling, Richmond County Health Dept., Columbia
SOUTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice Brady, R.N., State Dept. of Health, Pierre
TENNESSEE PUBLIC HEALTH ASSOCIATION, C. B. Tucker, M.D., State Dept. of Health, 420 Sixth Ave., N., Nashville
TEXAS PUBLIC HEALTH ASSOCIATION, Joseph N. Murphy, Jr., State Dept. of Health, Austin
UTAH PUBLIC HEALTH ASSOCIATION, Katherine Brandon, M.D., P. O. Box 25, Foothill Station, Salt Lake City
VIRGINIA PUBLIC HEALTH ASSOCIATION, Robert M. Parker, 401 Colley Ave., Norfolk 7
WASHINGTON STATE PUBLIC HEALTH ASSOCIATION, Vance McCallister, 1309 Public Safety Bldg., Seattle 4, Wash.
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION, Mrs. Katherine L. Brown, State Dept. of Health, Charleston 5
WISCONSIN ASSOCIATION FOR PUBLIC HEALTH, Paul Weis, RR No. 2, Waunakee
WYOMING PUBLIC HEALTH ASSOCIATION, Lee Holder, P. O. Box 2203, Cheyenne
MIDDLE STATES BRANCH, APHA, Thelma Luther, Dept. of Health, Des Moines 19, Iowa
SOUTHERN BRANCH, APHA, H. W. Stevens, M.D., Court House, Box 7525, Asheville, N. C.
WESTERN BRANCH, APHA, Robert G. Beaumier, 1309 Smith Tower, Seattle, Wash.

West Virginia: To Minimize Disaster

The 37th Annual Conference of the West Virginia Public Health Association (Clarksburg, May 10-12) was almost exclusively concerned with disaster health services. Program participants were listed as "staff," emphasizing the formally educational aspects of the conference, which was entitled "Health Mobilization — the Built-In Concept." Cooperating sponsors were the West Virginia Department of Health and the Public Health Service through the Communicable Disease Center, Atlanta. The latter furnished support materials for the conferees.

The theme was chosen "in view of

current world tensions and responsibilities of public health workers . . . for meeting the threat of disasters."

Stressed throughout the conference was the need for building stronger working relationships among local health departments, medical societies, allied medical groups, state governmental agencies, and other organizations if effective disaster service mobilization is to be achieved.

The faculty-staff of 37 members included Carruth J. Wagner, M.D., chief, Division of Health Mobilization, OSG, Public Health Service, who opened the conference with the topical paper. Among others giving instruction and counsel to the 223 registrants were Kirk T. Mosley, M.D., commissioner of health, Oklahoma State Department of Health, in "Health Mobilization in the Future"; Colonel Victor C. Searle, Chemical Corps, and Army Liaison Officer with the Department of Health, Education, and Welfare, in "Chemical and Biological Threat"; William F. Sands, assistant chief, Medical Self Help Training Section, Division of Health Mobilization, PHS, Chamblee, Ga., in "Family Survival"; and Newman H. Dyer, M.D., M.P.H., director, West Virginia State Department of Health, in "The State Plan for Health Mobilization."

Meetings for the five WVPHA Sections were held at luncheon periods during the conference. At the banquet Dr. Dyer presented 25-year service awards to five state and county health department employees.

The WVPHA officers for 1961-1962 are:

President—Eva B. Green, supervising nurse, Cabell County Health Department, Huntington

President-Elect—E. E. Myers, M.D., Myers Clinic, Philippi

Vice-President—Wanda V. Johnson, secretary, Kanawha County Health Department, Charleston

Treasurer—James Rosencrance, chemist, Division of Sanitary Engineering, State Health Department, Charleston

Executive Secretary—Katherine L. Brown, administrative assistant to director, Bureau of Tuberculosis, State Health Department, Charleston

Delegate to APHA Governing Council—L. A. Dickerson, M.D., director, Section of Preventive Medical Services, State Health Department, Charleston

Among the information disclosed through a "Statistical Analysis of Attendance," made by WVPHA following the conference, was the fact that representatives from 50 of the 55 counties in the state attended the conference.

Montana Elects

The Montana Public Health Association elected the following officers at the Association's annual meeting held in Butte in April:

President—Anna T. Beckwith, Helena

Vice-President—A. H. Trithart, D.D.S., M.P.H., director, Division of Dental Health, Montana State Board of Health, Helena

Secretary—Mrs. Lou Esmay, Gt. Falls

Treasurer—Ed Stowe, Billings

John X. Newman, Ph.D., Butte, was given special recognition for his 40-year membership in the American Public Health Association. Dr. Newman, presently retired from his position in charge of the laboratories at the St. James Memorial Hospital in Butte, held this position beginning in 1927 until the time of his retirement. Prior to his work in Butte he was the director of the State Board of Health Bacteriology Laboratory in Helena.

Connecticut: Urban Problems Mainly

Meeting 200 strong, the Connecticut Public Health Association assembled in Newington for its spring session on April 20. An engineer, a psychiatrist, a professional educator, and a local health officer were among those on hand to stimulate discussions and provide new ideas for delegates to take back home with them.

Malcolm C. Hope, chief, General Engineering Program, Public Health Service, probed urban growing pains in his paper, pointing out that ever more crowded metropolitan areas create environmental health problems which have little regard for political boundaries. It thus becomes increasingly important, he stated, for local health officials to learn "to speak the language of the city planner, the political scientist, and the public works official" and to cooperate with their counterparts in the water, sewer, housing, and zoning commissions.

J. E. Rosenfeld, M.D., physician-in-charge, Blue Hills Hospital, Division of Alcoho'ism, Connecticut State Division of Mental Health, warned of the pitfalls of unscientific thinking for the professional person. He gave "everyday thinking" as an example of it. This, he said, is not designed to be verified or is so designed—being subject to emotional and other early-acquired distortions—that verification is impossible. Exact science is concerned with verifiable information, is objective, logical, and corrected by reality, he reminded his audience. A cause of difficulty in man's search for knowledge is that scientific thought is superimposed upon our earlier (childhood), unscientific ideas, he said, and these continue to function and distort our concepts, even if unconsciously.

Edward M. Cohart, M.D., M.P.H., professor of public health, Department of Epidemiology and Public Health, Yale School of Medicine, spoke of the need for motivating each person in the community to assume more responsibility for his personal health. At the same time he sees the importance of stimulating full-time health services for all towns in the state via "a multi-town or metropolitan area basis." He distinguished between motivating people "to act once to authorize some public health measure" and motivating them to "perform repeated acts calculated to protect their health" such as those which would bring about early case finding of chronic illness. He, too, voiced the opinion that local political boundaries are not appropriate health boundaries. In establishing priorities for progress in the public's health he pointed out that "the size of the population to be served . . . must be large enough to . . . provide funds to employ the public health team . . . and require a sufficient number of . . . services to keep the members of the team fully occupied."

The subject of metropolitan sprawl was also addressed by Norton G. Chancer, M.D., M.P.H., director of health for Fairfield. Overcrowding of our towns, dwellings, schools, recreation facilities, hospitals, thoroughfares, parking areas, and so on, shows the necessity of zoning if we are to prevent population density from becoming an ungovernable problem. Required without question in the next few years are aggressive programs to handle refuse and sewage disposal, to prevent air and stream pollution, and to enforce housing and zoning codes.

Varied Programs in Louisiana

Delegates at the general session of the annual meeting of the Louisiana Public Health Association (Alexandria, April 27-28, 275 registrants), heard the following papers: "Modern Advances in Parasitology," by Dr. William W. Frye, dean, Louisiana State University School of Medicine, New Orleans; "Veterinary Medicine and Public Health," by Dr. James H. Steele, chief, Veterinary Public Health Section, Communicable Disease Center, Atlanta, Ga.; and "Effective Public Relations in a Public Health Program," by Bryan Blalock, The Borden Company, Marshall, Tex.

Among the speakers and their topics at the meetings of the six sections were: Public Health Administration—"DPW

Bedside Nursing Project," Dr. Ben Freedman, director, Division of Preventive Medicine, New Orleans Health Department; Public Health Nursing—"The Community and Mental Health," Dr. Arthur L. Searle, superintendent, Central Louisiana State Hospital, Pineville; Sanitarian—"The Duties of a Field Man and What Industry Expects of a Sanitarian," N. W. Lamb, The Borden Company, Houston, Tex.; and Laboratory—"Stream Pollution Abatement in Louisiana," John E. Trygg, director, Division of Public Health Engineering, Louisiana State Board of Health, and K. E. Biglane, executive secretary, Louisiana Streams Control Commission, Baton Rouge.

The Dr. Felix Formento Memorial Award went to Mrs. Meyer Benson, Shreveport Tuberculosis League. Agnes Morris Memorial Awards were presented to Dr. James A. Coleman, director, LaSalle, Catahoula, and Concordia Parish Health Units; Elvena Laurent, public health nurse, Red River Parish Health Unit, Coushatta; George Hayes, custodial worker at the Central Laboratory, New Orleans; George L. Hebert, sanitarian, Terrebonne Parish Health Unit, Houma; Whitney C. Martinez, seafood sanitarian, Food and Drug Division, New Orleans. Dr. Wallace Rubin, New Orleans, received the Axson-Choppin Award and Ruby E. Giroir, Lafayette, the C. B. White Memorial Award. The State Board of Health took the occasion to honor 14 of its employees with 20-year service pins and 34 with 10-year certificates.

A. G. Owens of Monroe succeeded Lucille Godelfer as LPHA president. His fellow officers for 1961-1962 are:

First Vice-President—Dr. John Bruce, New Orleans

Second Vice-President—Edna Irl Mewhinney, New Orleans

Secretary—George M. Ineichen, P. O. Box 1872, Monroe

Treasurer—John Lemasson, New Orleans

Missouri: Forward Motion Reviewed

The 35th Annual Meeting of the Missouri Public Health Association was held on May 8-10, in Kansas City, with approximately 300 persons in attendance.

Three speakers were featured at the opening general session: Arthur E. Rikli, M.D., chief of the Heart Disease Control Program, Public Health Service—"Moving Forward in Public Health"; Carroll P. Hungate, M.D., Kansas City, chairman, Civil Defense Committee, American Medical Association—"Will You Live Through the Next Ten Years?"; and Dr. W. D. Bryant, executive director, Community Studies, Inc., Kansas City—"The Current Challenge for Public Health."

"These are exciting days to work in public health, both from a legislative and a health service viewpoint," Dr. Rikli said. "Ideas are welcome as never before. Through meetings such as this one and other means of professional communication, they can be disseminated rapidly so that health workers all over the country can consider them and, where possible, try them out. Mass media speed the news about them to the general public, which responds by demanding that new programs and health practices that are working somewhere be applied in our own community."

He described history's evidence of progress in public health under three headings: "the brilliant output" of laboratory and clinical research; more effective utilization of physician time, complemented by the services of a growing number of other health workers; and the "re-evaluation of the role of the hospital, and of the complementary functions of nursing homes, and health services in the home."

In a paper rich with examples in support of his points, he cited the prediction of, preparations for—and then arrival on schedule of—the Asian Flu

epidemic in 1957, as a first, he believed, of its kind in the annals of public health surveillance. He spoke, too, of "the marvels in cardiac surgery . . . (which) 20 years ago . . . would have seemed just as remote as the primary prevention of heart disease does today."

Further illustrations—In 1900, "two-thirds of all professional health workers were physicians. Today, for every doctor, there are four other professional health workers."—"People suspect over-hospitalization when up to 50 per cent of the patients in a hospital can get up and go to the gift shop . . . but remain in the hospital with attention 24 hours a day." However, the doctor "is not over-hospitalizing the patient by sending him to the hospital when it is the only place he has access" to the special services that the community has to offer. "If the community were providing home nursing services, and homemaker services, the physician would be willing enough to have many patients discharged sooner." These kinds of needs are being recognized more and more, he stated.

The challenges to public health today, he said, "are mostly those that arise because more and more of us live in the city or supermetropolis, in a highly industrialized and contaminated environment; and those involved in providing comprehensive care, particularly for the aged and chronically ill." Following discussion of these problems, Dr. Rikli suggested five program areas in which health departments could complement physicians in their care of the chronically ill: find the cases early, bring them to medical care, assure continued medical care, implement medical care, and provide diagnostic service.

The eight MPHA sections met the second day, both morning and afternoon, presenting extensively varied scientific programs. Singled out for mention are:

Dental Health—Sessions were held in conjunction with the bistate meeting of the Missouri-Kansas State Dental Associations. One of the principal speakers was Donald J. Galagan, D.D.S., assistant chief, Division of Dental Public Health, Public Health Service, whose subject was "The Growing Role of Dentistry in Public Health."

Laboratory—Personnel from the Kansas City, Kans., Field Station of the Communicable Disease Center participated in the morning session. In the afternoon, delegates made a tour of the recently completed headquarters building of the Field Station to observe laboratory facilities and research in progress.

Sanitation—Three speakers presented papers: Evan Wright, director, Food and Drug Division, Kansas State Board of Health, "Public Health Aspects of Frozen Foods"; R. J. Woodruff, Jr., manager, Central Public Relations, Monsanto Chemical Company, St. Louis, "The Role of Public Relations in Public Health"; and Loyd F. Pummill, Division of Sanitary Engineering, Oklahoma Department of Health, "Oklahoma Registration Act for Sanitarians and the Program for Its Enactment into Law." In addition, Reuel Waldrop, consultant from the Communicable Disease Center station in Oklahoma City, moderated a panel discussion on "The Waldrop Plan of Community Sanitation."

Medical Care Services—Two papers, followed by panel discussion, were the principal fare at the morning session: "Planning Community Health Facilities," Edwin Given, health program representative, PHS Regional Office, Kansas City; and "Financing Community Health Services," John F. Pletz, chief, Bureau of Standards and Procedures, Missouri Division of Welfare. Joining this section in the afternoon were the Health Officer and Public Health Nursing Sections to hear about "Rehabilitation and Restoration of the Chronically Ill and Geriatric Patient"

from Franz Steinberg, M.D., Jewish Hospital of St. Louis; and "Care Programs for the Well Aged" from Samuel Zibit, executive director, Jewish Center for the Aged, St. Louis.

High point of the annual banquet was the presentation of MPHA's W. Scott Johnson Annual Award to Dr. Charles E. Lively, Department of Rural Sociology, University of Missouri, Columbia, in recognition of his original and significant studies in sociology and his application of the studies to public health.

Albert W. Happy, Jr., public health engineer, director of consultant services, Division of Health of Missouri, Jefferson City, succeeded Harry M. Dawdy as MPHA president. Other officers for 1961-1962 are:

President-Elect—Nicholas D. Duffett, Ph.D., St. Louis Division of Health Laboratory, St. Louis

Vice-President—C. W. Meinershagen, M.D., acting director, Tuberculosis Control, Division of Health of Missouri, Jefferson City

Secretary-Treasurer—Nadia Craver, secretary to director, Division of Health of Missouri, Jefferson City

Representative to the Governing Council—H. M. Hardwicke, M.D., acting director, Division of Health of Missouri, Jefferson City

At the business meeting MPHA resolved to:

1. Encourage the National League for Nursing to continue accrediting the programs of study offering specialization in public health nursing on a baccalaureate level until such time as the collegiate schools graduate a sufficient number of nurses to adequately meet the demand for qualified public health nurses.

2. Encourage all city, county, multicounty and city-county agencies, boards, or departments charged with the responsibility of protecting the public health to utilize fully the advice and counsel of the doctors of veterinary medicine residing in their area.

The next meeting of the association will be held in Jefferson City, May 14-16, 1962.

Washington's Pool Manual

The publication of "Swimming Pool Operation: A Manual for Operators" by the Washington State Public Health Association was noted in the September, 1960, issue of the Journal, page 1444. WSPHA ventured into the publishing business in the belief that as a professional society it must provide direct services to health workers and the public. This effort to honor its basic objectives has paid off well. The manual's popularity has been such that a second edition has had to be printed. Nor has interest in it been strictly local or regional. It was used in quantity at the Ninth Annual Swimming Pool Conference held in Virginia in May and at a conference of similar purpose in Washington, D. C., in June. The second edition, as the first, is available from WSPHA, 1309 Smith Tower, Seattle, Wash.; $1.25.

American Public Health Association Membership Application Blank on Page XXXI

EMPLOYMENT SERVICE

Annual Meeting Employment Service

An employment center will be located in the exhibit area of Cobo Hall at the 89th Annual Meeting for the period November 13-16, 1961. The service will be sponsored by the Michigan Employment Security Commission, an affiliate of the U. S. Employment Service, and the Association. Professional personnel will be available to assist employers and employees. Vocational counseling will also be available.

Employers and candidates are urged to file beforehand. This should be done through your local state employment service office. Filing by October 15 is requested so that records can be duplicated and forwarded to the meeting. It will be possible to register at the meeting also. Early registration at the employment center will facilitate making appointment arrangements.

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages. **Closing date** for receipt of advertisements is the first of the month preceding the desired month of publication. **All correspondence should be sent to the American Public Health Association, 1790 Broadway, New York 19, N. Y.**

POSITIONS AVAILABLE

Assistant Director of Public Health Dentistry—for the Colorado State Department of Public Health. Requires M.P.H. degree. Salary $884-$1,128. May hire above beginning rate depending upon qualifications of applicant. Please contact Dalton Roberts, Chief, Administrative Services, Colorado State Department of Public Health, 4210 East 11th Ave., Denver, Colo.

Dentist—Preferably with public health experience, for school health work. Salary $8,000, plus travel expense and generous fringe benefits. If interested, write to V. K. Volk, M.D., Health Commissioner, Saginaw County Department of Health, 1501 North Michigan Ave., Saginaw, Mich.

Public Health Physician—for position of chief, Division of Preventive Medicine, with San Diego County Public Health Department. Two years' supervisory experience with public health agency required. Annual salary $15,348-$16,920, plus 10 per cent if certified by the American Board of Preventive Medicine and Public Health. Write County Civil Service, Room 403, Civic Center, San Diego 1, Calif.

Physician—Experienced in rehabilitation, to direct long-term medical care program. **Physician**—to head outpatient department. Expanding program in County Hospital. Starting salary $15,000 or over, depending on training and experience. Send biography with inquiry to F. G. Gillick, M.D., Santa Clara County Hospital, San Jose-Los Gatos Rd., San Jose 28, Calif.

Public Health Officer—with M.P.H. degree. Central Wisconsin city of 33,000 population. Wire, stating qualifications, age, marital status, and salary expected. Mayor Ben C. Schuck, Wausau, Wis.

Commissioner of Public Health—for the city of Worcester, Mass., population 200,000. Minimum requirements: citizenship, M.D. from Grade A medical school, public health degree, practical public health experience. Well organized staff, 75 full time, 50 part time. Ideal living conditions. Maximum salary at present $15,000. Position now available. Apply, outlining qualifications, background, and salary desired, to Francis J. McGrath, City Manager, City Hall, Worcester, Mass.

SANITARY ENGINEER II

Needed by

STATE OF ALASKA

Salary: $840-$1,005 per month.

Duties: Responsibility for planning program and activities in the field of waste disposal and water resources management. Program content and scope is coordinated with Federal Water Pollution Control activities and involves work in state phase of Federal WPC Construction Grant program; field surveys and reporting on water quality; inspection and enforcement in pollution problems; coordination and consultation on waste disposal problem activities with local health agency; consultation with professional engineering concerns on the design and operation of treatment facilities for municipal sewage, industrial wastes, and state and federal government installations, including facilities for radioactive wastes; review of plans for related work; and promotion of or active research work on special problems.

Requirements: Graduation from college with engineering degree, registered professional engineer eligible for Alaska registration, and six years' experience in professional sanitary engineering.

Civil service, retirement benefits, and annual and sick leave.

Write air mail to: Personnel Officer
Alaska Department of Health and Welfare
Alaska Office Bldg.
Juneau, Alaska

Health Officers—Florida is seeking well qualified public health physicians for several vacancies. All coastal locations. Beginning salary based upon previous experience. Travel allowance, retirement program, employees' insurance, no state income tax. For additional information write Wilson T. Sowder, M.D., State Health Officer, Florida State Board of Health, Box 210, Jacksonville 1, Fla.

Crippled Children's Physician—Position in the Hawaii Department of Health, to direct medical care program for crippled children and administer program for prevention of children's disease and deformity. Requires one year of public health experience or master's degree in public health and eligibility for certification by the American Board of Pediatrics, Orthopedics, Neurology, or Plastic Surgery. Salary $11,064-$14,112 per annum. Contact Department of Personnel Services, 825 Mililani St., Honolulu 13, Hawaii.

Institution Medical Services Director—Position with the Hawaii Department of Health. Responsible for the medical, dental, laboratory, and nursing care services in an institution for the mentally retarded. Requires eligibility for certification by the American Board of Pediatrics, Internal Medicine, or Psychiatry and Neurology, and eligibility for a medical license in Hawaii. Salary $10,032-$12,804 per annum. Write to Recruiting and Examining Division, Department of Personnel Services, 825 Mililani St., Honolulu 13, Hawaii.

Medical Director—for state-wide Tuberculosis Control Program for the state of Nevada with headquarters in Reno. Salary $1,007-$1,348, depending upon training, experience, and board certification in an appropriate specialty. License: eligibility for licensure in Nevada. Excellent recreational opportunities, including fishing, hunting, water sports, and mountain climbing. Exceptional fringe benefits. For further information contact Nevada State Personnel Department, Carson City, Nev.

District Health Officer—Public health administrator of a district area; district epidemiologist. Plan, organize, supervise work of professional staff consisting of engineers, nurses, sanitarians, nutritionists, dental hygienists, health educators, and social workers. Requires M.D. and M.P.H. degrees and license to practice medicine in Wisconsin. Salary: starting rate $1,006, $1,131, or $1,256 per month, depending on training or experience which can be credited toward board certification in public health. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits, travel allowance. For applications and further

information write R. J. Siesen, Personnel Officer, State Board of Health, State Office Bldg., Madison 2, Wis.

Health Officer—Full time, for thriving city in eastern Wisconsin. Salary is $10,320-$12,240, with fringe benefits. Contact F. A. Nause, M.D., Commissioner of Public Health, Sheboygan Department of Public Health, 1208 South 8th St., Sheboygan, Wis.

Public Health Nurse—Salary from $4,836 to $5,592 in four years. Mileage, retirement, sick leave, 18 workdays' vacation per annum. High, dry climate; four seasons; college town; merit system. Merle E. Smith, M.D., M.P.H., Director, Coconino County Health Department, Flagstaff, Ariz.

Director of Public Health Nursing—County Health Department (population 82,000). Supervise staff of eight public health nurses. Requires bachelor's degree and at least three years' health department supervisory experience. Salary range $505-$607, with starting step negotiable to $554. Write Health Officer, County Health Department, P. O. Box 360, San Luis Obispo, Calif.

Maternal and Child Health Nursing Consultant—Position with the State of Hawaii Department of Health, Bureau of Maternal and Child Health. Requires five years' nursing experience, of which three years must have been in public health nursing and involving one year of teaching or supervisory responsibility; graduation from nursing school and college; completion of a college program in public health nursing; and graduate study in obstetrical and/or pediatric nursing. Salary $6,156-$7,860 per annum. Write to Department of Personnel Services, State of Hawaii, 825 Mililani St., Honolulu 13, Hawaii.

Executive Director—Public Health Nursing Association. Own headquarters; 16-nurse staff; generalized nursing service. Administrative ability and M.A. degree desired. Salary open. Apply to Mrs. Fred P. Bamberger, Personnel Committee Chairman, 2906 Bayard Park Dr., Evansville, Ind.

Public Health Nurse Supervisor and Qualified Public Health Nurses—Needed in generalized nursing program. Large urban and rural area containing capital city and state university. Two-hour drive to summer and winter recreational facilities. Well qualified health officer. Social Security and retirement plan. Staff nurses must have graduated from accredited school of nursing and completed 30 hours of public health nursing study. Write Director of Nursing Service, Ingham County Health Department, Lansing 23, Mich.

SANITARIANS

Needed by

STATE OF ALASKA

Salary:	Southeastern Alaska	Southcentral Alaska	Central and Northwestern Alaska
Sanitarian I	$525-$630	$555-$660	$585-$690
Sanitarian II	$600-$720	$635-$755	$670-$790
Sanitarian III	$685-$820	$720-$855	$755-$890

Education requirements:

Graduation from accredited university with major study in basic sciences.

Experience requirements:

Sanitarian I —None.

Sanitarian II —Two years with health agency in field of sanitation.

Sanitarian III—Four years of progressively responsible experience in field of sanitation, including administrative, fiscal, and personnel responsibilities.

Civil service, retirement benefits, annual and sick leave benefits.

Write air mail to: Personnel Officer
Alaska Department of Health and Welfare
Alaska Office Bldg.
Juneau, Alaska

SANITATION SUPERVISOR

Outstanding opportunity for qualified man as sanitation supervisor for the Kitchens of Sara Lee, leading quality manufacturer of bakery and other food products.

Successful applicant must have good technical background and minimum five years' experience supervising sanitation personnel.

This position offers opportunity for growth to position of Plant Sanitarian. Excellent salary and working conditions in modern air-conditioned plant.

Please send résumé, including salary information, to R. T. James, Director of Personnel.

Kitchens of Sara Lee
5353 North Elston Ave.
Chicago 30, Ill.

Public Health Nurses—Generalized program in County Health Department in Detroit metropolitan area. Progressive department, recently selected as nursing teaching center. Salary dependent on training and experience. Liberal benefits, including pension plan, Social Security, partial Blue Cross-Blue Shield, professional liability insurance, sick and annual leave. Write Oscar D. Stryker, M.D., Director, Macomb County Health Department, 43525 Elizabeth Rd., Mount Clemens, Mich.

Supervisor (R.N.) — Out-Patient and Emergency Room Service. Challenging position in new 485-bed General Hospital located in suburbs of large Middle Atlantic city. Experience in the field of public health and M.S. degree preferred; B.S. with experience acceptable. Salary based on experience. Write **Box M-31,** Employment Service, APHA.

Supervising Nurse—City-County Health Department, Eau Claire, Wis., has exceptional opportunity for supervising public health nurse. Salary open, depending on qualifications. Liberal fringe benefits. Write Personnel Office, City Hall, Eau Claire, for application and further information.

Public Health Nurse III (District Advisory Nurse)—Give guidance and counseling to all public health nurses in a multiple-county area regarding community organization and relationships, program planning, public health nursing technics, records, and reporting. Responsible for inservice education program for local public health nurses and evaluation of nursing services. B.S. degree with major in public health nursing and three years' generalized experience as a public health nurse. Special requirements: registration or eligibility therefor as a registered nurse in Wisconsin; certification or eligibility for certification as a public health nurse in Wisconsin. New salary range effective July 1, 1961: $6,072-$7,872. Civil service, vacation, sick leave, Social Security, insurance and retirement benefits. Write Ione M. Rowley, R.N., Director, Public Health Nursing, 119 Monona Ave., Madison 3, Wis.

Chronic Disease Consultant Nurse—Participate in planning and conducting in-service education programs in cardiovascular disease for nurses. Develop and evaluate materials appropriate for implementation of nursing activities in the control program. Participate in over-all and local program planning, and in screening programs. Bachelor's degree in public health nursing or advanced preparation in nursing specialty; four years' experience in public health nursing, including one in supervision or advisory capacity. New salary range effective July 1, 1961: $6,912-$8,952. Civil service, vacation, sick leave, Social Security, insurance and retirement benefits. Write R. J. Siesen, Personnel Officer, State Board of Health, Madison 2, Wis.

Assistant State Director of Public Health Nursing—Give consultation to public health personnel in all phases of public health nursing, including inservice education; prepare manuals, guides, etc., for public health nurses; assist in administration of program. Bachelor's degree in public health nursing minimum preparation; master's degree desirable; four years' experience in public health nursing, including two in administration or supervision. New salary range effective July 1, 1961: $7,512-$9,732. Civil service, vacation, sick leave, Social Security, insurance and retirement benefits. Write Miss Ione M. Rowley, R.N., Director, Public Health Nursing, 119 Monona Ave., Madison 3, Wis.

Public Health Nurses—for immediate appointment in urban and rural areas of Dutchess County, located about 75 miles east of New York City. Annual salary $4,490-$5,285; maximum reached in three years. Cars provided. Excellent personnel policies. Apply to Director of Nurses, Margaret Wells, Dutchess County Health Department, 236 Main St., Poughkeepsie, N. Y.

Sanitarian—County Health Department (population 82,000); coast and mountains; mild climate. Generalized sanitation program. Requires registration and experience. Salary

$419-$505, starting level negotiable to $460 for well qualified person. Write Health Officer, P. O. Box 360, San Luis Obispo, Calif.

Health Educator—to work on district program, headquarters in attractive city of Albuquerque. Little travel outside city. M.P.H. in health education and two years' experience. Beginning salary $5,760. Many benefits. Write Director, Health Education Division, New Mexico Department of Public Health, 408 Galisteo St., Santa Fe, N. M.

Health Educator—to work state wide. Excellent opportunity for program development with health departments and local voluntary agencies. Master's degree in health education required. Salary $6,000. Unusually good fringe benefits. Contact Franklin K. Brough, Executive Director, Utah Tuberculosis and Health Association, 1941 South 11th East, Salt Lake City 5, Utah.

Dental Hygienist—for established dental health program in well equipped, modern health department. Salary range $4,320-$5,400 per year, plus liberal travel allowance. Write to J. H. White, M.D., Director, Weld County Health Department, P. O. Box 521, Greeley, Colo.

POSITIONS WANTED

On Box Numbers, Address APHA at 1790 Broadway, New York 19, N. Y.

Public Health Physician—M.D., D.P.H., M.P.H. (University of North Carolina). Experience includes ten years as health officer of a large jurisdiction, epidemiology, environmental medicine, health education, graduate teaching. Desire position in the United States. **Box PH-15,** Employment Service, APHA.

Health Program Director—M.P.H.; ten years' supervisory experience in planning and organizing health and medical care programs, including personnel recruitment and training. Registered analytical statistician. Interested in community health research and development, and patient care financing. **Box C-57,** Employment Service, APHA.

More on Public Health Service Reorganization

An Office of Resource Development (Environmental Health) has now been established within the Bureau of State Services of the Public Health Service. The new office represents another step in the reorganization of the Service to provide, among other objectives, "a more coordinated, integrated, and intensive focus" upon the public health problems created by environmental hazards stemming primarily from air and water pollution, exposure to radiation, and occupational and industrial developments. The new office is headed by Frank A. Butrico. Engineer, Director Grade.

BOOK REVIEWS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

WELFARE IN AMERICA—By Vaughn Davis Bornet. Norman, Okla.: University of Oklahoma Press, 1960. 319 pp. Price, $4.95.

For the public health officer, nurse, engineer, or educator who has not had the opportunity of familiarizing himself with the social welfare programs, forces, and interrelationships developing within the community, the state, and the nation, Vaughn Davis Bornet's book on "Welfare in America" may serve as a useful source of information and orientation. After tracing the development of welfare programs in the United States, including public health and medical care of the indigent, the book deals with many vital questions confronting the welfare field today: the basic objectives of welfare programs; the interrelationships between government and voluntary agencies; the question of fee charging for welfare services; the sensitive matter of fund raising through individual agency efforts, community chests, and united funds; the over-all role of voluntary health agencies; and the present and future status of social workers.

The chief value of this work is that it points up the many questions with which public and voluntary health and welfare agencies are struggling in each of the areas covered. However, it would be most unfortunate if the reader were to peruse this book uncritically or to feel, upon completing the last page, that he has sufficient and unbiased information on the various subjects.

The author does not appear to have grasped, or at least not to have accepted many concepts which govern health and welfare programs in the country today. For example, after giving an adequate account of the development of public and voluntary services, he considers them as rival agencies and he cannot understand how each may supplement the other.

His discussion of social workers, about whose professional status he has some reservations, of business and community leaders, and of community councils and chests is done in such a derogatory tone as to make an unfavorable impression upon one whose observations and experiences with these individuals and agencies have left a much more positive impression. To impugn the objectives of the majority because of shady motives of a very vocal minority is hardly a progressive evaluation of welfare in America.

I. Jay Brightman

STEPS IN THE DEVELOPMENT OF INTEGRATED PSYCHIATRIC SERVICES—Proceedings of the 36th Annual Conference, 1959. New York, N. Y.: Milbank Memorial Fund (40 Wall St.), 1960. Price, $1.00.

This volume reports the 1959 Milbank Fund Conference on Community Mental Health. For those familiar with the earlier Milbank Fund mental health conference reports, identification of this volume as one of the series is a recommendation to read it. Like its predecessors, it is a brief, clear, and lively report of some hard thinking about the organization, processes, and requirements of mental health programs.

The report is in three parts. In the first, mental hospital superintendents from New York, New Jersey, and Connecticut, sent by the Milbank Fund to visit the "open hospitals" in England, describe the visit and its consequences for their own hospitals. In the second part, Dr. Robert Hunt describes the

Dutchess County unit of the Hudson River State Hospital (New York), designed to provide comprehensive treatment services for the mentally ill of that county. In the third part, Dr. Ernest Gruenberg describes the plan for evaluating some of the effects of the Dutchess County unit. The discussion of each part is reported fully. As in previous Milbank reports, the quality of the discussion and the skill and candor with which they are reported are outstanding.

This conference is principally concerned with activities of the Milbank Fund itself. Its emphasis is local and practical; and its spirit is one of illuminating the present rather than the future. As a reflection of important current concerns, this volume is a valuable addition to a distinguished series, and very much worth several hours of thoughtful reading. ALAN D. MILLER

RIVER BASIN ADMINISTRATION AND THE DELAWARE—By Roscoe C. Martin, et al. Syracuse, N. Y.: Syracuse University Press, 1960. 390 pp. Price, $5.00.

Comprehensive management of the total water resources of the Delaware River Basin would result from the adoption of legislative measures proposed by the authors of this book. On a two-step basis it is recommended that a Delaware River Agency for Water be established by federal law as soon as possible. The second step of the proposal consists of the establishment of the Delaware Water Commission by a Federal-Interstate Compact comprising the four states concerned and the federal government. Under the proposed compact the new agency would have responsibility for the development of water supplies, pollution control, flood protection, watershed management, recreation, power, and the regulation of water diversion in the River Basin.

Although the first step of the proposal was rejected by the Delaware River Basin Advisory Committee, legislation to create a Federal-Interstate Compact has already been enacted by the State of New York and has been introduced into the Congress and the legislatures of the other three states.

In addition to proposals for the administration of water resources, this book, by using the Delaware River Basin as a case study, examines the concept of government administration of river basins and comments on the economic, legal, and political aspects of regional development. KARL M. MASON

NOTES OF A SOVIET DOCTOR (2nd ed.)—By G. S. Pondoev. Translated by Basil Haigh. Introduction by Iago Galdston. New York, N. Y.: Consultants Bureau (227 West 17th St.), 1959. 238 pp. Price, $4.95.

The subject of medicine and public health in the Soviet Union is, or should be, of interest to all concerned with the organization and provision of health services. Material on this subject is not easily available, so that the volume reviewed here is all the more welcome. It was written by an experienced older Soviet practitioner for medical students and young physicians. Starting with the vocation of the doctor, the author discusses in turn the doctor-patient relationship; the history of medicine; the nature of medicine as art or science; the doctor's mode of thought; history-taking, diagnosis, prognosis, prevention and treatment; medical ethics, the doctor and the law, and finally homeopathy and quackery. Much of what Pondoev says will be easily accepted by Western physicians, but throughout there are statements that bring one up short. As such it provides insight into the ideological context of Soviet medicine. Thus the chapter on medical history emphasizes the importance for the physician of the historical approach, but the chapter deals with Russian medicine of the 19th and 20th centuries. The theme is implied in the author's statement that he will deal with "independent Russian

medicine, which began in the second half of the nineteenth century after the use of national consciousness associated with political events and with the overthrow of foreign domination in Russian medical institutions." This book is worth reading as a document of a period in the history of Soviet medicine.

GEORGE ROSEN

RADIATION TECHNOLOGY IN FOOD, AGRICULTURE AND BIOLOGY — By Norman W. Desrosier, and Henry M. Rosenstock. Westport, Conn.: Avi (P.O. Box 388), 1960. 418 pp. 124 illus. 77 tables. Price, Domestic $12.50; Foreign $13.50.

The last seven chapters discuss the technology implied in the title and also some chemical and other applications of radiation. Uses of radiation to produce useful plants and animals including microorganisms, through genetic mutations, and to wipe out harmful insects by releasing radiation-sterilized males are discussed. Food preservation receives special attention.

Wholesomeness tests conducted by the Army on radiation-sterilized foods and the final chapter dealing with radiological safety will interest public health workers.

The first 14 chapters cover the underlying sciences in an elementary way including nuclear and atomic physics, radiation, chemistry, and biology. As in most textbooks which try to cover the elementary aspects of so vast a field in so small a space, the impression is created that nearly all conceptual problems have been solved and that almost nothing is controversial. The book is historical and descriptive rather than critical.

It is the opinion of this reviewer that some of the explanations of nuclear physics may be misleading and that it is safer to consult the sources listed in the bibliography than to rely on the explanations of these matters given in the book.

DANIEL E. LYNCH

CHILD GUIDANCE CENTRES—By D. Buckle and S. Lebovici. World Health Organization Monograph Series No. 4. New York, N. Y.: Columbia University Press (2960 Broadway), 1960. 127 pp. Price, $4.00.

This monograph, one of a series published by the World Health Organization, is based on papers and subsequent discussions at the seminar held under the auspices of the Regional Office for Europe in September, 1956.

The primary team of the child guidance center is composed of the child psychiatrist, the psychologist, and the social worker; other members of the team are the pediatrician, the teacher (for remedial teaching), the physical therapist (for children with motor defects), and the speech therapist (for correction of speech defects). The monograph discusses the importance of the case history as a device both in diagnosis and treatment. It emphasizes the concept of teamwork, and attempts to define the qualifications and functions of each team member. It outlines the content of the diagnostic process, both with the child and his family, consisting of the psychiatric examination; the physical examination; psychological testing; collection of social, cultural, and economic data; and study of relationships within the family and of the relationships of the family with its various environments. The use of the team case conference method is recommended.

Two classifications of behavior disorders in children are presented—one "descriptive," the other "dynamic and structural." The authors state that "surveys estimate the proportion of children in need of the advice and care of child guidance specialists at between 1 per cent and 40 per cent" and that "in Great Britain the results of recent studies show that 8 per cent of children need treatment at any given moment." They also state that "the ideal in any European town would no doubt be to provide for at least one child guidance team for

every 45,000 inhabitants." The immediate question which comes to mind is the shortage of trained personnel in the field, and the need for recruitment efforts as well as steps to train general physicians, social workers, psychologists, and nurses to be able to cope with problems of mental health more effectively.

The chapter on treatment discusses three methods used—psychotherapy aimed at changing the child's personality, methods directed at altering the causes which exist in the environment of the child with particular reference to members of his family, and methods aimed at improving the adjustment of the child to his environment. Both individual and group methods are discussed.

The authors describe the functions of the child guidance center, both in professional and public education. There is also a chapter on principles regarding the establishment of new centers—the site, size, and architecture, size of staff, and financing. In the appendix there is a section on record keeping.

This is a valuable contribution and certainly at the high level of other monographs published by WHO. However, the reviewer would have liked to have seen a more adequate discussion of both prevention and case findings. This volume is recommended as a reference for workers in the mental health and child health fields.

HELEN M. WALLACE

AIR POLLUTION—World Health Organization Monograph Series No. 46. New York, N. Y.: Columbia University Press (2960 Broadway), 1961. 442 pp. Price, $10.00.

Representing as it does a collection of reports presented at a meeting of the WHO Expert Committee on Environmental Sanitation in Geneva in 1957, and thus almost four-years old, the information contained in this monograph hardly warrants the epithet "recent," by which the Introduction characterizes it. In the rapidly growing area of air pollution, a four-year interval is long enough to assign to this volume mainly a historical value. Relegated to this bibliographic position, however, the monograph offers a comprehensive summary of the then-existing knowledge about the public health aspects of air pollution. Because of the happy circumstance that any group of experts called together to discuss this particular subject are bound to represent many widely divergent disciplines, the several chapters—including discrete discussions of meteorology, sampling, physics and chemistry, biologic effects upon human beings, animals, and plants, economic and social factors, community planning, process controls, fuel selection, legislation, and radioactivity—are remarkably free of overlapping content. This very disciplinary variety, however, makes for a rather limited audience. Most of the chapters are, on the one hand, too technical for readers engaged in other disciplines; and, on the other hand, too preludial to satisfy the expert. As with most conference proceedings, the volume probably offers its greatest rewards to the actual participants.

MAY SHERMAN

THE HEART IN INDUSTRY—Edited by Leon J. Warshaw. New York, N. Y.: Hoeber, Medical Division of Harper (49 East 33rd St.), 1960. 677 pp. Price, $16.00.

Twenty-four authors have combined under the editorship of Dr. Warshaw to present a readable and extremely useful reference work. It is intended, according to the editor, to supplement standard texts on cardiology in focusing on the occupational aspects of heart disease to which the standard text usually devotes little attention.

The public health practitioner will be interested in the special problems which industry faces in employing the person with cardiac disease. How are these people evaluated and can they be placed

in gainful employment? The physician working in industry will find many answers to his questions, but, perhaps of even more importance, he will find well written discussions of subjects for which there are as yet no definitive answers.

This reviewer was particularly pleased with the excellent discussion by Dr. Warshaw on the "Cardiovascular Effects of Toxic Occupational Exposures." Seldom do we find this subject discussed, much less discussed so well.

A few more illustrations would have been of help in some chapters, and we would question the use of the term chronic toxicity for chronic exposure, but with these few minor exceptions this is a work which this reviewer is unable to criticize. It should be of great value to physicians in all types of practice as well as physicians, nurses, and health educators in public health practice.

MITCHELL R. ZAVON

THE INFECTIOUS DISEASES OF DOMESTIC ANIMALS (4th ed.)—William A. Hagan and D. W. Bruner. Ithaca, N. Y.: Cornell University Press (124 Roberts Place), 1961. 1033 pp. Price, $11.50.

This is the fourth edition of a widely used text on the infectious diseases of domestic animals, with special reference to etiology, diagnosis, and biologic therapy. Dr. Hagan, for many years the distinguished professor of bacteriology at Cornell (where he is now an emeritus professor), has chosen as his collaborator Dr. D. W. Bruner, who is his successor at Cornell.

The new text has maintained the high quality of previous editions and is an authoritative reference book in the field of veterinary medicine.

The authors do not give consideration to relationship of animal diseases that may be transmitted to human beings—with the exception of "Bangs Disease," and a few others—thus the text is not of special interest to the public health officer. The whole field of animal parasitology is excluded from consideration in the text.

The illustrations are well executed. The index is complete.

WILSON G. SMILLIE

MEDICAL CARE UNDER THE NEW YORK WORKMEN'S COMPENSATION PROGRAM—By Louis Reed. Sloan Institute of Hospital Administration. Ithaca, N. Y.: Cornell University, 1960. 208 pp. Price, $2.00.

This monograph gives an excellent description of the New York Workmen's Compensation Program as it stood in 1957-1958. Naturally, there will be changes in the compensation law and in administrative procedures from time to time, but there have been none of sufficient significance in the past few years to invalidate the findings and conclusions in Mr. Reed's study.

The author's views are not based merely on an armchair appraisal but are the result of a number of field studies as well as an analysis of the law itself and of numerous reports of the Workmen's Compensation Board, of a number of investigating commissions, and other documents. The historical notes will be of permanent value regardless of future changes in the law. Of particular interest to this reviewer was the discussion of the position of hospitals in caring for compensation cases. Some of the controversies in regard to remuneration of hospitals explain why some hospitals have not always been anxious to accept compensation cases.

The good and bad features of the New York law are presented in an objective manner with proper emphasis on the destructive effects of litigation. A little more attention might have been given to the role of certain lawyers in interfering with good medical care and in obstructing rehabilitation.

In one chapter the author compares the New York Workmen's Compensation Program with that in Ontario. The latter is considered by many to be a

model program and undoubtedly it has much to commend it. There is always some question as to the adaptability of a program that has been successful in one setting to a much more complex situation. New York is not Ontario.

Mr. Reed's suggestions for improving the New York program are well considered and sound but, as he points out, not much improvement in medical care is likely to occur until some of the litigious atmosphere is dispelled.

LEONARD J. GOLDWATER

PRINCIPLES OF COMMUNITY HEALTH— By Jack Smolensky and Franklin B. Haar. Philadelphia, Pa.: Saunders (West Washington Square), 1961. 352 pp. Price, $6.00.

Although the text does not identify the audience for which it is intended, perusal quickly indicates that it is intended for students who are preparing to teach health or physical education in secondary schools. The book gives emphasis to the educational aspects of community health. Presentation of technical, biological, and medical material is limited in scope and depth. Many of the charts and illustrations are taken from semipopular and proprietary publications.

The authors use most of their examples from California and Oregon, therefore, the text has somewhat of a regional approach. Two of the 13 chapters are devoted to radiological health and space health, respectively, thereby overemphasizing these fields while others such as arthritis, air pollution, and occupational health tend to be neglected. The coverage on organization and administration of health agencies is disappointing. The presentation of each chapter is done in good style, containing a telegraphic summarization at the beginning and having a section entitled "Questions for Review" and a list of references. The book is not, in our judgment, suitable for students in schools of public health, medical schools, or even undergraduate nurses. It would be useful, however, to readers who are interested in community organization and health education.

Of miscellaneous appendixes, one contains "Health Department Inspection Forms" in the field of environmental sanitation. This text may be useful to a high school teacher who plans to work in a health department as a sanitarian during summer vacations.

On the whole, this book should be useful in teacher-training courses. One would hope, however, that future editions might benefit more from the participation of a medical author.

VLADO A. GETTING

AGING: PROGRESSIVE PROGRAMMING— American Public Welfare Association. Chicago, Ill.: The Association (6006 South Stony Island), 1961. 41 pp. Price, $1.25.

This short pamphlet embraces presentations of four authors. The theme is predominantly one of the problems of social welfare agencies, especially public welfare, in planning suitable activities, adequately financing, and staffing such activities directed toward the problem of older people. The final paper on the "Basic Emotional Needs of the Older Person" is the only one of the series which maintains a focus on certain of the needs which might be met in part through the sorts of programs envisioned in the earlier three papers.

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

AUTOMATIC PROCESS MONITORING. Annals of the New York Academy of Sciences, Vol. 91, Art. 4. Edited by Franklin N. Furness. New York, N. Y.: The Academy, 1961. Pp. 819-935. Price, $4.00, plus 15 cents for postage and handling.

BASIC NURSING EDUCATION PROGRAMMES. A Guide to their Planning. WHO-Public Health Papers No. 7. Katharine Lyman. New York, N. Y.: Columbia University Press, 1961. 81 pp. Price, $1.00.

BEHAVIORAL APPROACHES TO ACCIDENT RESEARCH. Herbert H. Jacobs, et al. New York, N. Y.: Association for the Aid of Crippled Children, 1961. 178 pp. Price, $1.50.

CHEMICALS IN YOUR FOOD AND IN FARM PRODUCE: THEIR HARMFUL EFFECTS. Franklin Bicknell. New York, N. Y.: Emerson Books, 1961. 192 pp. Price, $2.95.

COMMUNITY DEVELOPMENT IN EUROPE. No. 6, 1960. M. Milhaud, et al. Rome, Italy: International Review of Community Development, 1961. 171 pp. Price, $3.00.

COMMUNITY DEVELOPMENT—THEORIES AND VALUES. No. 5, 1960. A. Meister, et al. Rome, Italy: International Review of Community Development, 1961. 225 pp. Price, $3.00.

COMPARATIVE EPIDEMIOLOGY OF MENTAL DISORDERS. Edited by Paul H. Hoch and Joseph Zubin. New York, N. Y.: Grune and Stratton, 1961. 290 pp. Price, $9.75.

COST OF SOCIAL SECURITY 1949-1957. Washington, D. C.: International Labor Office, 1961. 238 pp. Price, $3.00.

CRISIS IN AMERICAN MEDICINE. Edited by Marion K. Sanders. New York, N. Y.: Harper, 1961. 149 pp. Price, $3.75.

CUMULATIVE INDEX OF HOSPITAL LITERATURE 1955-1959. Chicago, Ill.: American Hospital Association, 1961. 443 pp. Price, $17.50.

CURRENT RESEARCH IN CHILDHOOD ACCIDENTS. Edward A. Suchman and Alfred L. Scherzer. New York, N. Y.: Association for the Aid of Crippled Children, 1960. 56 pp. Limited distribution.

EXPERIMENTAL IMMUNOCHEMISTRY (2nd ed.). Elvin A. Kabat and Manfred M. Mayer. Springfield, Ill.: Thomas, 1961. 905 pp. Price, $26.50.

FIELD STUDIES IN THE MENTAL DISORDERS. Edited by Joseph Zubin. New York, N. Y.: Grune and Stratton, 1961. 495 pp. Price, $6.75.

GENETIC PERSPECTIVES IN DISEASE RESISTANCE AND SUSCEPTIBILITY. Annals of The New York Academy of Sciences, Vol. 91, Art. 3. Henry A. Wallace, et al. New York, N. Y.: The Academy, 1961. Pp. 595-818.

HEALTH EDUCATION (5th ed.). Edited by Bernice Moss; Warren Southworth; and John L. Reichert. Washington, D. C.: National Education Association of the U. S., 1961. 429 pp. Price, $5.00.

HOSPITALS, DOCTORS, AND DOLLARS. Robert M. Cunningham, Jr. New York, N. Y.: F. W. Dodge Corp., 1961. 275 pp. Price, $6.95.

IMMUNOCHEMICAL APPROACHES TO PROBLEMS IN MICROBIOLOGY. Edited by M. Heidelberger and O. Plescia. New Brunswick, N. J.: Rutgers University Press, 1961. 402 pp. Price, $6.00.

IN VITRO AND IN VIVO EFFECTS OF AMINE BUFFERS. Annals of the New York Academy of Sciences, Vol. 92, Art. 2. Gabriel G. Nahas, et al. New York, N. Y.: The Academy, 1961. Pp. 333-812. Price, $4.50.

IONIZING RADIATION AND HEALTH. WHO Public Health Papers No. 6. Bo Lindell and R. L. Dobson. New York, N. Y.: Columbia University Press, 1961. 84 pp. Price, $1.00.

LAUGHTER IN THE LONELY NIGHT. Henry Viscardi, Jr. New York, N. Y.: Paul S. Eriksson, 1961. 338 pp. Price, $5.00.

LEGAL PROBLEMS AFFECTING PRIVATE SWIMMING POOLS. Edited by F. Reed Dickerson. New York, N. Y.: Hoffman-Harris, 1961. 126 pp. Price, $7.50.

MANAGEMENT OF THE DOCTOR-PATIENT RELATIONSHIP. Richard H. Blum. New York, N. Y.: McGraw-Hill, 1960. 304 pp. Price, $8.50.

NEW HORIZONS FOR CANADA'S CHILDREN. Proceedings of the First Canadian Conference on Children, 1960. Edited by B. W. Heise. Toronto, Canada: University of Toronto Press, 1961. 199 pp. Price, $2.00 paper, $4.50 cloth.

PHARMACEUTICAL ADVERTISING. A Survey of Existing Legislation. Offprint from "International Digest of Health Legislation," Vol. 12, No. 1, 1961, Geneva. New York, N. Y.: Columbia University Press, 1961. 53 pp. Price, $.60.

PREMATURE BABY, THE (5th ed.). V. Mary Crosse. Boston, Mass.: Little, Brown, 1961. 266 pp. Price, $7.00.

PROTECTION AGAINST RADIATION. John D. Abbatt; J. R. A. Lakey; and D. J. Mathias. Springfield, Ill.: Thomas, 1961. 235 pp. Price, $6.50.

PSYCHIATRIC NURSING. Ruth V. Matheney and Mary Topalis. St. Louis, Mo.: Mosby, 1961. 281 pp. Price, $3.75.

RADIOACTIVE WASTES. Their Treatment and Disposal. Edited by John C. Collins. New York, N. Y.: Wiley, 1961. 239 pp. Price, $8.00.

REPORT WRITING IN PSYCHOLOGY AND PSYCHIATRY. Jack T. Huber. New York, N. Y.: Harper, 1961. 114 pp. Price, $3.50.

STRESS AND YOUR HEART. Fred Kerner. New York, N. Y.: Hawthorn Books, 1961. 237 pp. Price, $4.95.

SUBLUXATION AND DISTORTION OF JOINTS WITHOUT FRACTURE. Rowland Hill Harris. New York, N. Y.: University Publishers, 1961. 156 pp. Price, $6.00.

TEACHING AND LEARNING IN MEDICAL SCHOOL. George E. Miller. Cambridge, Mass.: Harvard University Press, 1961. 304 pp. Price, $5.50.

TEXTBOOK OF HEALTHFUL LIVING (6th ed.). Harold S. Diehl. New York, N. Y.: McGraw-Hill, 1961. 484 pp. Price, $6.75.

VOLUNTEER SERVICES IN MENTAL HOSPITALS. Report of the Institute for Directors of Volunteer Services in Mental Hospitals, 1960. New York, N. Y.: National Association for Mental Health, 1961. 255 pp. Price, $1.00.

YOU AND YOUR FOOD. Ruth Bennett White. Englewood Cliffs, N. J.: Prentice-Hall, 1961. 466 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Raymond S. Patterson, Ph.D., F.A.P.H.A.

"New Epoch"—It appears, concludes an editorial introduction to five papers on mass health education, that the English are at the beginning of a new epoch in the use of films for educational work. Although the more expensive documentaries will continue to be produced, the shorter, entirely visual and stimulatory film will undoubtedly gain in popularity. Like all visual aids, such films increase the teachers responsibility, but that is not a bad thing, the editor thinks. All five papers are out of the ordinary and commended to you.

ANON. Editorial. Health Ed. J. 19,2:61 (May), 1961.

For Laymen Only—In matters of psychiatry most of us in public health—barring our mental health brethren of course—are laymen. Well, here for laymen, are a baker's dozen of new papers on as many aspects of psychiatry's impact on modern living by top-notch writers. (With them is one on what causes lunatic asylums, also well done.) They should be both interesting and improving to all healthfully curious laymen—whether physicians, engineers, nurses, educators, et al.—including you.

COBB, S. Mind and Body (and 13 related papers). Atlantic Monthly 208,1:63 (July), 1961.

Telling the Neighbors—An evaluation consultant from south of the border explains to a Canadian audience the principles underlying the evaluation process. The said process requires each plan to carry a description of the idea and a statement of purpose, the methods and means to be used, and a reporting practice related to the rationale of the program. There is a certain clarifying effect that comes from any attempt to tell a distant audience about home-town projects that make this exposition unusually interesting.

FLECK, A. C., JR. Evaluation as a Logical Process. Canad. J. Pub. Health 52,5:185 (May), 1961.

Show Us, Says She—It is the opinion of this professor that information is still too meager to recommend any major change in the dietary of the general population. Whether the "polyunsaturated" diets will be found to prevent or ameliorate cardiovascular diseases remains to be proved. With such limited knowledge as we have we cannot state reasonable allowances for fat or indicate the characteristics of fatty acid mixtures most favorable for health.

GOLDSMITH, G. A. Highlights on the Cholesterol-Fats Diets and the Atherosclerosis Problem. J.A.M.A. 176,9:111 (June 3), 1961.

Local Yardstick—As a tentative measure for local health department performance, a state health department administration drew up 34 indexes that are subject to measurement. They are now being refined and worked over preparatory to testing. You will be interested.

HEUSTIS, A. E. Local Health Services: How Do We Measure Up? Canad. J. Pub. Health 52,6:241 (June), 1961.

Preliminary Communication — "The softer the water in the county boroughs of England and Wales the higher the local death rate from cardiovascular diseases tends to be." Here, then, is more confirmation of our recent American findings about this peculiar statistical relationship.

MORRIS, J. N., et al. Hardness of Local Water-Supplies and Mortality from Cardiovascular Diseases. Lancet 7182:860 (Apr. 22), 1961.

Immunizing Newborns—Half the newborns and 93 per cent of the three-month-old babies fed Type 1 poliovirus vaccine in this trial are considered to have been actively immunized. Newborns with low passive antibody titers responded as well as did the older infants.

LEPOW, M. L., et al. Effect of Sabin Type 1 Poliomyelitis Vaccine Administered to Newborn Infants. New England J. Med. 264,21: 1071 (May 25), 1961.

Measles Prophylaxis—Three papers reporting on clinical and immunologic responses to attenuated measles virus vaccine make it clear that effective immunity against the disease is being achieved and that, if gamma globulin is given with the vaccine, unpleasant reactions may be avoided. However, the researchers are of the opinion that the vaccines are not yet suitable for general community use.

MCCRUMB, F. R., JR., et al. Studies with Live Attenuated Measles-Virus Vaccine. A.M.A. Am. J. Dis. Child. 101,6:689 (June), 1961.

Deaf Infants—In minute detail, this account relates the beginnings and the settled conduct of a (Br.) local health department's efforts to discover the town's partially deafened infants and toddlers and the remedial services instituted together with arrangements for their special educational needs. This is a topic seldom discussed in American public health journals.

PARKEN, D. S. A Service for Deaf and Partially Deafened Children. M. Officer 105, 23:335 (June 9), 1961.

For Better Hospitals—Presented here are: (1) the basis of public interest in hospitals, (2) the safeguards

of this interest, (3) the role of government, (4) future needs for reasonable supervision, and (5) the setting up of hospital standards. A timely discussion.

SHAIN, M., and ROEMER, M. I. Hospitals and the Public Interest. Pub. Health Rep. 76,5:401 (May), 1961.

Unexpected Finding—"In healthy populations, it seems reasonable to infer that the heavier members will eat considerably more food than the light. Our purpose here is to show that observed facts, surprisingly, do not accord with this." They found that heaviness is generally associated with diminished physical activity.

THOMPSON, A. M., et al. The Relation Between Calorie Intake and Body-Weight in Man. Lancet 7185:1027 (May 13), 1961.

What Food Upsets You?—Most people have very positive ideas about this matter. And diets are prescribed for all sorts of alimentary disabilities with fine confidence and assurance. But when a distinguished committee looked over these commonly held beliefs about the effects of certain foods upon healthy people and the diets prescribed for digestive disorders, they found so little that is really known about these matters that they decided if anything is ever to be achieved to gain understanding a scientific investigation should first be made to find out what various foods actually do within the digestive system.

WEINSTEIN, L., et al. Diet as Related to Gastrointestinal Function. J.A.M.A. 176,11:935 (June 17), 1961.

The Great Debate—The two Americans who seem, currently, to be doing the most (1) to build up the evidence that cigarette smoking is an important contributory cause of lung cancer, and (2) to persuade the public to ignore statistical, chemical, biologic, and pathologic evidences, both do their best to present their sides of this continuing debate. Hence the papers are as well worth your thoughtful perusal as exercises in forensics as they are in their scientific conclusions—which are probably pretty well known to you.

WYNDER, E. L. An Appraisal of the Smoking, Lung Cancer Issue (and) LITTLE, C. C. Some Phases of the Problem of Smoking and Lung Cancer. New England J. Med. 264,24: 1235 (June 15), 1961.

If additional information is desired regarding the articles listed in this bibliography, please communicate directly with the publications in which they appeared; the addresses are furnished for your convenience.

A.M.A. Am. J. Dis. Child. (American Journal of Diseases of Children), American Medical Association, 535 North Dearborn St., Chicago, Ill.
Atlantic Monthly, 8 Arlington St., Boston, Mass.
Canad. J. Pub. Health (Canadian Journal of Public Health), 150 College St., Toronto 5, Canada.
Health Ed. J. (Health Education Journal), Tavistock House, Tavistock Sq., London, W.C.1, England.
J.A.M.A. (Journal of the American Medical Association), 535 N. Dearborn St., Chicago 10, Ill.
Lancet. 7 Adams St., Adelphi, London, W.C.2, England.
M. Officer (Medical Officer), Chronicle House, 72-78 Fleet St., London, E.C.4, England
New England J. Med. (New England Journal of Medicine), Massachusetts Medical Society, 8 The Fenway, Boston 15, Mass.
Pub. Health Rep. (Public Health Reports), Government Printing Office, Washington, D. C.

CREDIT LINES

The Journal cannot furnish copies of items mentioned in Credit Lines. Please send requests to the addresses given.

County Sees Its Health Profile

The publication of "What's the Health Situation in Macoupin County, Illinois? —a Community Self-Study," by the county's Health Improvement Association, was Phase V in the operational plan of the study, "a pilot project for the state." The plan was prepared (Phase I) in 1956 with the help of the University of Illinois Extension Service in Agriculture and Home Economics and the Illinois Department of Health, Bureau of Health Education; cooperating groups included the medical society, schools, clubs, and voluntary health agencies. Phase II (1956-1958) was the organization of study groups on maternal and child health, school health, adult health, disease control, sanitation and community services. These helped set the stage for Phase III (1958), the Family Health Survey—2,048 families, averaging 3.32 members, interviewed; and the School Health Survey—47 out of 50 schools. In the family survey 260 interviewers, "most of them homemakers who donated their time as a public service," used a much pretested questionnaire to determine the health problems "as viewed by the families who were surveyed." In Phase IV the State Health Department tabulated and analyzed data in the family survey; the university did the same for the school survey.

The entire project was looked upon as an educational process as well as a fact-finding mission. The report itself is an educational tool presenting aptly chosen statistical information and sound public health viewpoints on a variety of important program areas. Such views and data are clearly tied in with the generous supply of facts disclosed through the surveys. These reveal, for example, that, based on the sample, Macoupin County's death rate from heart and related diseases is considerably higher than for the nation, that only one out of every 10 adult women there is taking advantage of known technics for the early detection of cancer, that only 157 families reported at least one adult had received an eye pressure test for glaucoma within the year, and that over 2½ per cent of the population have chronic conditions serious enough to prevent them from regular activities. Add these data to those accumulated in the report on accidents, housing, milk supplies, garbage and sewage disposal, zoonoses, etc., and the county's health status begins to show up in clear profile—a definite advantage to those who will be responsible for implementing study findings. And "There is reason to believe that the people . . . most intimately involved in the project will provide the leadership" for follow-up action.

Macoupin County Health Improvement Association, Carlinville, Ill., 98 pages, $1.

Safe Levels: Toxic Dusts and Gases

Since it is not practical to maintain completely uncontaminated air in most industrial situations, it is necessary to establish maximal acceptable concentrations of atmospheric contaminants. These concentrations represent not a scale of relative toxicity, but the levels of con-

centration below which ill effects are unlikely to be experienced by any but hypersusceptible individuals.

The American Standards Association Sectional Committee on Acceptable Concentration of Toxic Dusts and Gases, Z37, has now published three guides under the general caption, "Maximal Acceptable Concentration of" on Benzene, Xylene, and Toluene. The committee was sponsored by the American Industrial Hygiene Association. Lewis J. Cralley, Ph.D., senior scientist, Public Health Service, represented the American Public Health Association on the committee. Available from ASA, 10 East 40th Street, New York 16, N. Y., $1 each.

Readings in Radiological Health

"Radiological Health Handbook" (PB 121, 468 pages, $3.75), first published by the Public Health Service in 1957, is now revised, current to September, 1960. The new edition, similar in scope to the original, contains sections on physical, chemical, and mathematical data; radioisotope, decay, and radioassay data, and radiation protection data, with updating of much material, especially the Table of Isotopes. The glossary has been expanded and modified to make it consistent with definitions in the American Standard Association's "Glossary of Terms in Nuclear Science and Technology." Also revised is the Chart of the Nuclides.

"The Community Impact of Peaceful Applications of Atomic Energy" (TID-8202, 80 pages, $1) reports on a survey conducted by the American Municipal Association for the Atomic Energy Commission to evaluate the impact of such applications on the nation's cities and towns. Part of the message: "Local governments . . . already active in the new atomic energy field, in line with their long established responsibility to seek community benefits through industrial and economic development and to provide protection for the public against potential hazards . . . in the future will have an even greater share of responsibility . . . (and) must be prepared to handle the day-to-day problems connected with living and working with the atom as well as with the emergency situations that may arise." The report goes on to urge local communities where atomic energy industrialization is under way to conduct surveys of radiation sources and calls upon officials to build up a reservoir of trained health and engineering personnel with a background in radiation use and protection. Eighty pages, $1.

The above items are available through the Office of Technical Services, U. S. Department of Commerce, Washington, 25, D. C.

"Radiation Protection-Medical Radiography" is a new publication of the Rensselaer County (N. Y.) Health Department and complements its earlier "Radiation Protection—Dental Radiography" (see A.J.P.H. November, 1960, page 1834). It briefly discusses the precautions that should be taken to protect patients and the operator during x-ray and fluoroscopy. Available from the health department, headquartered in Troy. J. A. Salvato, Jr., P.E., is director of the Division of Environmental Hygiene which prepared the brochure.

"A Primer of Radiation Protection" by R. J. Schulz, assistant professor of radiology, Albert Einstein College of Medicine, "was originally undertaken for the purpose of giving the resident physician in radiology who is familiar with the basic concepts of radiological physics, a relatively concise introduction to the physical aspects of radiation protection," but is likely to be useful to many others working in the field. Chapters discuss radiation units, maximum permissible dose, absorption processes and radiation shields, determina-

tion of shielding requirements, radium and radioisotopes, and radiation detectors. Available from Ansco, Binghamton, N. Y.; 40 pages, gratis.

Paramedical Schools Studied

A study which concludes that school facilities in Missouri for training certain categories of health workers are by and large adequate to produce the desired number of graduates has been made under the auspices of the recently established Medical Care Research Center of the Jewish Hospital of St. Louis and Washington University (see A.J.P.H. February, 1961, page 353). The study was done for the Missouri Council on Health Careers and concerned itself with training facilities for such paramedical groups as dietitians, medical technologists, nurses, physical therapists, and social workers. Made in the light of previous studies which indicated the needs for such personnel in local hospitals, it may have the effect of reducing concern over brick and mortar components of the shortage and of redirecting attention to finding more successful technics for recruiting.

One by-product of the study is the recognition that the answers to certain additional questions might be sought in future surveys of this kind. The study report indicates, for example, that "more information is needed about the number of drop-outs in schools that have programs extending for more than one year."

David A. Gee, associate director, the Jewish Hospital of St. Louis, prepared the report. Limited number of copies available through the MCHC, c/o American Cancer Society, Jefferson City.

Worth Looking Into

"Significance of Public Attitudes in the Rehabilitation of the Disabled" reviews the formation of social attitudes as seen through present concepts in social psychology and sociology. G. Allan Roeher, Ph.D., discusses in some detail the effect of negative attitudes on the disabled and how these can be modified by the workers and agencies responsible for rehabilitation programing. The author is coordinator of rehabilitation for the province of Saskatchewan and director, Coordinating Council on Rehabilitation for Saskatchewan. Available from Rehabilitation Literature, 2023 West Ogden Ave., Chicago 12, Ill., as Reprint DR-28; 25 cents.

"Man's Best Friend—or Enemy?," a leaflet produced by the Evanston (Ill.) Department of Health, is an educational piece which sets forth major points of local laws affecting the dog owner, speaks convincingly about the need of innoculation for rabies control, and in the case of a bite or scratch, tells what steps to take. The "Don't" list contains sound advice for preventing bites to begin with. Sample copies upon request. Permission to reprint with appropriate changes will be granted to any state and local health department that requests it.

The Evanston health department's 1960 Annual Report may furnish an entry for idea books. The agency gave a luncheon to celebrate the 13th anniversary of fluoridating the Evanston water. Guests of honor were 12-year-old twins born exactly nine months after fluoridation was started, who have lived in Evanston all their lives and whose teeth are completely free of cavities. A mock check for $154,202 was presented to the mayor representing an estimate of the dental bills saved by the decrease of caries in Evanston children since fluoridation. The report also gives the latest data in the Evanston follow-up study of the caries attack rate on permanent teeth for six- through eight-year-olds. Comparisons with prefluoride rates show remarkable results.

"Cataract and Glaucoma: Hope Through Research" could be read to advantage by many kinds of health workers, although in most respects it appears to be geared to public consumption. Given public apathy toward such undramatic diseases as glaucoma, health workers could be most helpful in getting this pamphlet into proper hands and then read. They may, however, prefer to look upon it more as a source book for their local educational ventures than as an item to put into the hands of many individuals. The pamphlet distinguishes between cataract and glaucoma (performing a service in the process by also pointing out the difference between eye doctors and technicians over which public confusion persists). It then describes some of the research being done on them—and tells "where you can find help." Prepared by the National Institute of Neurological Diseases and Blindness. PHS Publication No. 793, Health Information Series, No. 99. Single copies free from PHS direct. For sale at Gov. Ptg. Office, Washington, 25, D. C.; 15 cents.

Edwin J. Faulkner, president, Woodmen Accident and Life Company: "Social policy should support private voluntary health insurance if it has the capacity to meet the problems of financing health care costs to the satisfaction of most Americans. That such popular approval of health insurance exists . . . is substantiated by opinion polls and similar studies." Jerome Pollack, program consultant, Social Security Department, United Automobile, Aircraft and Agricultural Implement Workers of America: "When unemployment insurance was unavailing from private carriers, a governmental program was resorted to. When health insurance was unavailing from government, a voluntary system was adopted. . . . We have adopted (this) split-level protection with remarkable success in many basic insurances and now contemplate doing it with health insurance for the aged."

Thus were some of the lines drawn to provoke debate in the Symposium on Insurance and Government, Section on Health Insurance and Social Policy, held at the University of Wisconsin School of Commerce in September, 1960. Papers of these two speakers and the discussions they stimulated are published in the university's Insurance Series, Volume II, No. 5, September, 1960, available through Fund for Insurance Education and Research at the school, Madison 6, Wis.

The Wisconsin Anti-Tuberculosis Association's Crusader for February, 1961, rallies the public to the topic "Needed: Better Local Health Departments." A question and answer section explains three bills before the 1961 legislature that are said to represent "the first major effort at over-all improvement of Wisconsin's local health system since 1839." The bills: envision county health commissions having jurisdiction over all areas in its borders not served by a city or village board of health; would provide for more workable methods of financing full-time departments ("1728 local health officers, most of whom being extremely part-time and untrained"); would create an advisory committee on local health services to the state board of health—"necessary to make a start in the right direction." The public health philosophy behind these changes is portrayed to advantage by the deputy health commissioner of Green Bay, Karl A. Mohr. The state medical society and other professional groups voice strong support for the legislation and are quoted. WATA which has distributed this issue and an accompanying flier widely in the state is able to supply limited quantities of both without charge. WATA is at 1700 West Wells St., Milwaukee 1, Wis.

"Helping Parents of Handicapped Children: Group Approaches," published by the Children's Hospital Medical Center in Boston and the Child Study Association of America, contains the proceedings of their jointly sponsored 1959 Conference. Speakers from the fields of medicine, public health, psychiatry, and parent education deal with the needs of handicapped children, the psychiatric implications underlying parents' concern for them, what parents can gain from group approaches and community planning for these parents. The panel discussion on these papers is summarized. From Child Study Association of America, 9 East 89th St., New York 28, N. Y.; $1.25.

Conference for Western States on World Health

Public health and medical specialists from the western and other regions of the United States will be joined by speakers from the World Health Organization on the program of a World Health Conference to be held at the University of California at Los Angeles, October 6 and 7. Among the topics to be discussed are nutrition, environmental health, mental health, communicable diseases, nursing care, and health education in underdeveloped countries.

Sponsors of the conference are the UCLA Schools of Public Health and Medicine, University of California Extension, College of Medical Evangelists, University of Southern California Medical School, Los Angeles County Medical Association, Southern California Public Health Association, Los Angeles Chamber of Commerce, and the American Association for the United Nations, Southern California State Council.

The program is being planned so that the general public as well as professional personnel may participate. Inquiries about the conference should be sent to the Department of Continuing Education in Medical and Health Sciences, UCLA Medical Center, Los Angeles 24, Calif.

NEWS FROM THE FIELD

WHO News

WHO Appeals for Aid to New States

At a meeting in June WHO's 24-member Executive Board reviewed the assistance given by WHO to the Republic of the Congo (Leopoldville) and to other newly independent states. The board appealed to member states and organizations that are able to help the new countries in development of their health services to do so in conjunction with WHO and the recipient governments so that the best possible use can be made of all the available aid. WHO-aided programs are in operation or in the active planning stage in Cameroun, the Central African Republic, Chad, the Republic of the Congo (Brazzaville), Dahomey, Gabon, Guinea, Ivory Coast, Madagascar, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo, Upper Volta, and the Republic of the Congo (Leopoldville).

The board approved of the emphasis that WHO has placed on the education and training of Congolese health personnel who eventually would have to operate their own health services. In the course of the session Director-General M. G. Candau, M.D., informed the Executive Board that 481 doctors were working in the Congo, compared to the 761 employed there, according to available reports, before independence was achieved. Among other data he presented on the staffing and development of health services in that country: At the time of independence there were no Congolese doctors; at the University of Lovanium, outside Leopoldville, there were 19 medical students, of whom one or two will probably graduate in 1961; 61 Congolese "assistants medicaux" are now completing their studies in medical schools in France to obtain a degree; this year it is hoped to give such training to another 30, and offers have been received from at least three countries of Europe to receive them.

Basics for Public Health Schools

"Recommended Requirements for Schools of Public Health—Tenth Report of the Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel" presents a working definition of a school of public health, and sets forth the school's functions, keeping in mind "diversity of organizational patterns" throughout the world. The report also enumerates the various categories of medical and paramedical personnel for whose training the school may be required to provide, and deals with the importance of its research activities, and its service to the community in the form of disease control programs, establishment of model health centers, etc. Recommendations pertain to elements in the organizational structure of schools of public health—among them legal status, governing board, faculty council, function of director or dean, and financing. The committee describes five basic areas of study — public health administration, principles and practice; health statistics; epidemiology; environmental health; and microbiology — and suggests content of material and teaching methods.

Before the committee met, a questionnaire was sent to some 50 schools of public health throughout the world in an effort to find common elements and to help outline requirements to be fulfilled by such institutions. Replies from 44 of the schools formed the basis of committee discussions. The replies had been analyzed in a working paper by James L. Troupin, M.D., director of professional education for the APHA, which had lent his services to the committee before and during its meetings

in Geneva in December, 1960. Committee chairman was Ernest L. Stebbins, M.D., M.P.H., dean, Johns Hopkins School of Hygiene and Public Health.

WHO Technical Report Series, 1961, No. 216, 24 pages, 30 cents; also published in French and Spanish. Available through Columbia University Press, 2960 Broadway, New York 27, N. Y.

Coordination of Research on Viruses

"Arthropod-Borne Viruses: Report of a Study Group" outlines procedures for determining the viruses' presence in yet unexplored or incompletely studied areas, and deals with the characteristics of enzootic foci, serological surveys and virus isolation. The study group examines classification systems, the criteria for acceptance of an arthropod-borne virus, and serological grouping and identification. It also reviews the clinical, epidemiological, geographical, and virological criteria for the diagnosis of virus infections and discusses technics of case-finding and systems of reporting. Among other subjects covered are ecological aspects, the establishment and functions of reference laboratories, and information exchange procedures. A final section on control measures is followed by a series of annexes including facsimiles of a questionnaire for collecting information on virus strains and of a punch card presenting data on an arthropod-borne virus. Dr. R. M. Taylor, School of Public Health, University of California, Berkeley, chaired the study group.

WHO Technical Report Series, 1961, No. 219, 68 pages, $1; also available in French and Spanish. Columbia University Press, 2960 Broadway, New York 27, N. Y.

Health and Morbidity Surveys

The WHO Expert Committee on Health Statistics met in Geneva last December. Its deliberations and recommendations are contained in a Seventh Report recently published. Dr. F. E. Linder, director, National Center for Health Statistics, Public Health Service, was chairman. Prominent on the agenda was the committee's review of the objectives, types, and methodological aspects of morbidity and health surveys, their potentials and limitations and their field of application. The committee distinguished the survey method of obtaining health statistics from the routine collection and analysis of vital and health statistics. One of the ten sections of the report is devoted to preparations being made for the Eighth Revision of the International Statistical Classification of Diseases, Injuries and Causes of Death.

WHO Technical Report Series, 1961, No. 218, 28 pages, 30 cents; also available in French and Spanish. Columbia University Press, 2960 Broadway, New York 27, N. Y.

National Citizens Committee

The proceedings of the Eighth Annual Meeting of the National Citizens Committee for the World Health Organization held in San Francisco, November 1-3, 1960, are now available at $1 a copy from NCC for WHO headquarters, 1790 Broadway, New York 19, N. Y. The Forum Session of this meeting was devoted to "The American Image Abroad."

Human Factors in Pollution Control

Approximately 80 speakers took part in the technical program of the 54th annual meeting, Air Pollution Control Association (New York City, June 11-15). Their papers were grouped under such headings as administrative and legal, research, control equipment, incineration, community surveys, health, and Control Official's Conference.

Among the speakers at the last named were Arthur J. Benline, New York City Department of Air Pollution Control, whose topic was "Cooperating for Cleaner

Air," Richard E. Hatchard and Morton Sterling from the control authorities, respectively of Oregon and Detroit, who described surveys of state and local administration of programs, and Edward Wellin, Ph.D., director, Behavioral Sciences Activities, APHA, who discussed "Cultural Aspects of Environmental Health."

According to Mr. Benline "the citizen may often feel that we are being unfair to the 'little man' . . . in demanding that his defective equipment be repaired within, say, 30 days, while a timetable established with, for example, the Consolidated Edison company . . . may run for two or three years." He stated that it is up to the department "to make it as clear as possible to the public, particularly by way of the mass media, why the program in a particular instance is so costly and . . . time-consuming."

Dr. Wellin said that all specialists view the tools and subject matter of their trade through characteristically conditioned "spectacles." Lay members of the community view the same things through differently conditioned eyes. Thus the community sometimes regards environmental changes or controls for attaining worth-while ends as means toward other ends, even undesirable ones. He predicted that social sciences and the professions that deal with the environment are going to have to work more closely together. Social scientists "have much to learn about the relationship between social systems and the environments in which they occur, and environmental health workers have something to learn . . . about human behavior . . . and the relationships between the cultures by which and the environments in which men live."

At the sessions on health it was pointed out by more than one speaker that exposure to air pollution is potentially influential in the development of chronic respiratory disorders, although it was acknowledged that more evidence of cause and effect is needed. One of the papers given was by I. Jay Brightman, M.D., New York State Department of Health, with co-authors Alexander Rihm, Jr., and Sheldon W. Samuels, both of the New York State Air Pollution Control Board: "Air Pollution and Health: New Facts from New York State." Again, the human element was spotlit: "Saying air pollution is bad does not convince the public that air pollution is bad for them as individuals." Among the other speakers at this session was Warren Winklestein, M.D., of the Erie County Health Department, who described "The Erie County Air Pollution Respiratory Function Study."

The Keynote Session was on Ambient Air Quality Standards under the chairmanship of Leonard Greenburg, M.D., of the Albert Einstein College of Medicine, New York City. John R. Goldsmith, M.D., California State Department of Public Health, voiced the conviction that "physiological and epidemiological criteria, applied through air quality standards with the advice of the best scientific judgment available, do provide a reasonable way of assuring that technical and industrial progress is consistent with and contributes to a healthy community." Frank L. Seamans, attorney, Pittsburgh, Pa., expressed the hope that "specific standards will not be established before there is sufficient information and scientific data on which to do so properly and with confidence." Other keynote speakers were Elmer Wheeler, Monsanto Chemical Company, St. Louis, on "Environmental Aspects," and Vernon G. MacKenzie, Division of Air Pollution Control, Public Health Service, on "Approaches to Air Quality Regulations."

Dental Center for Research, Training

First of its kind, the National Dental Health Center was opened in July on

the grounds of the Public Health Service Hospital in San Francisco. Its purpose is twofold. It will provide facilities both for applied research in the prevention and control of dental diseases and for training dental public health workers in the application of research findings. This dual approach is designed to reduce substantially the time lag between the discovery of new knowledge and technics and their subsequent use in dental health programs.

Operated by the Division of Dental Public Health and Resources, NDHC will have a staff of 20 during the first year. George Nevitt, D.D.S., presently regional dental consultant in PHS Region VII, will direct the center and its training activities. John Greene, D.D.S., now a graduate student in epidemiology at the University of California, will head the epidemiology program.

Changes in New Mexico Heart Program

The New Mexico Department of Public Health has accepted the administrative responsibility for the rheumatic fever control program initiated in 1959 by the New Mexico Heart Association. This provides penicillin at reduced cost to patients over the period of time necessary for adequate treatment. The heart association, which has acted as the clearing house for dispensing the special prescription blanks required for participation and has kept the records, including the registry of more than 600 cases, will transfer these program activities to the Division of Preventive Medicine in the NMDPH within the next three months. The association will continue to provide consultation along with the Rheumatic Fever Program Coordinating Committee which is sponsored by the New Mexico Heart Association, Medical Society, Pharmaceutical Association, and Department of Public Health.

Utah Warns on Disposable Syringes

The Utah State Department of Public Health has taken a lead by addressing a letter to manufacturers of disposable syringes, health departments, and a variety of professional organizations throughout the country, which warns that the use of disposable syringes presents a very serious problem of disposition after use. For example, "Narcotic addicts have gained access to these syringes . . . children have used them in play, and . . . several lawsuits are already involved." It urges manufacturers to include in each syringe package a simple tool to facilitate destruction of the used syringe. It also urges organizations and agencies to inform users of disposable syringes about this problem and the need to remedy it. James D. Wharton, M.D., is interim director of public health for Utah, with headquarters in Salt Lake City.

National TB Association Meets

The sessions of the National Tuberculosis Association's 57th Annual Meeting (Cincinnati, May 21-25) were planned to uncover weak spots in the total control program and to design more effective future campaigns. Approximately one-third of the sessions were devoted to public health—some with nursing—a few highlights of which follow.

George Silver, M.D., chief, Division of Social Medicine, Montefiore Hospital, New York City, emphasized that the modern outpatient clinic should be the center of a network of services focused on the patient, not an isolated unit. While the care needed by the patient walking about and one flat on his back in a hospital is different, the difference is mainly one in emphasis, according to Dr. Silver. Ambulatory service should logically fit into a pattern and become one of a series of services in the de-

livery of total medical care which fulfil the patient's needs in a different way: "This is patient-centered, rather than institution-centered, medical care," he said.

W. J. Steininger, M.D., assistant medical director of the William H. Maybury Sanatorium, Northville, Mich., said that a change in policy from punishing drunkenness to rewarding sobriety has brought excellent results in dealing with the alcoholic, refractory tuberculosis patient in the sanatorium. Patients are placed in a special "protective custody" section "to obtain better results from uninterrupted treatment, and to protect them from their bootlegger friends. . . . Sobriety and conformity are rewarded by transfer to the Maybury Men's Club. Here, under minimal nursing supervision, patients enjoy a large measure of self-government, with recreational and diversional activities, active vocational training, and automatic privileges as work tolerance increases. Irregular discharge in this section is one tenth that in the rest of the institution."

Action now to clear the air of pollutants was demanded by Vernon G. MacKenzie, chief, Division of Air Pollution Control, Public Health Service, Washington, D. C. "The technics are available to control most types of air pollution but they are not being used," said Mr. MacKenzie. "We cannot justify our procrastination on the basis of lack of 'positive proof.' There is sufficient circumstantial evidence linking air pollution and chronic pulmonary disease to inaugurate effective control programs now, just as our forebears did a hundred years ago on the basis of circumstantial evidence linking filth and intestinal communicable diseases." He pointed out that 90 per cent of the urban population lives in localities with air pollution problems and that only 106 communities of 6,000 needing control programs have programs in effect.

A streamlining of the organizational structure of the voluntary health agency to perform with maximum competence its role of service was urged by Robert H. Hamlin, M.D., associate professor of public health administration, School of Public Health, Harvard University. Staff director of the Exploratory Study of Voluntary Health and Welfare Agencies in the United States conducted by the ad hoc committee appointed and financed by the Rockefeller Foundation, Dr. Hamlin stated that "These agencies have provided needed services, developed and pioneered new methods, and made major contributions to the improvement of the health and welfare of the American people. . . . The American people, however, are now asking an increasing number of questions about their voluntary agencies," not as to their need but as to the "competence of the agencies to carry out the roles which have been assigned to them. Thus the structure and the methods of voluntary agencies . . . have become the prime issues."

Herbert C. DeYoung, Chicago, is president of the NTA. President-elect is H. Stuart Willis, M.D., Chapel Hill, N. C. Meeting with NTA were its Medical Section, the American Thoracic Society, and the National Conference of Tuberculosis Workers.

In Brief . . . .

The American Board of Industrial Hygiene was chartered as a nonprofit corporation under the laws of the Commonwealth of Pennsylvania in September, 1960. The incorporators were selected by the American Conference of Governmental Industrial Hygienists and the American Industrial Hygiene Association from among their respective memberships. The ABIH now invites inquiries from those interested in applying for voluntary certification in the profession of industrial hygiene.

Certificates will be issued on the basis of an examination to those who have eight years of practice, following a suitable baccalaureate degree. No examination will be required of those who have 15 years of practice with recognized contributions to the field, following acceptable education. Certain specialists within the field will be certified when one-fourth of their time has consistently been devoted to application of their specialty to industrial hygiene. A brochure describing the certification program may be obtained from Henry F. Smyth, Jr., Secretary-Treasurer, ABIH, 4400 Fifth Avenue, Pittsburgh 13, Pa.

This past spring both chambers of the First State Legislature of Hawaii adopted resolutions (Senate 47, House 133) congratulating Richard K. C. Lee, M.D., state director of health, on the occasion of his 25th anniversary of service in the Hawaii State Department of Health, and recognizing "his dedication, devotion (and . . .) contributions to state government and the public welfare. . . ." The recently completed five-story State Health Department building in Honolulu was dedicated at ceremonies in April. The new headquarters is within a block of buildings for other departments of the state, a large general hospital and state and county medical society offices. . . . The Hawaii State Health Department has published "Public Health in Hawaii: a Historical Perspective." Amply illustrated with photographs old and new, it is based on material presented by George V. Moorhead, M.P.H., at the Pan-Pacific Public Health Conference in Honolulu last November cosponsored by the Hawaii and the American Public Health Associations.

Now available is the complete schedule for training courses for fiscal 1962 (July, 1961, through June, 1962) given through the Robert A. Taft Sanitary Engineering Center (SEC) of the Public Health Service. The courses are short-term technical offerings presented by the SEC's Divisions of Occupational Health, Radiological Health, Engineering Services, Air Pollution, and Water Supply and Pollution Control. The courses given through the SEC's laboratories in Maryland, Alabama, and Nevada are listed as well as those given at headquarters in Cincinnati. Of a total of 60 courses yet to be offered, four are scheduled for September: 11-12, Basic Radiological Health (6R), Las Vegas; 12-14, Milk Pasteurization Controls and Tests (95M), at SEC; 20-22, Sampling and Identification of Aero-Allergens (86A), at SEC; and 25-29, Engineering Management of Nuclear Emergencies (83R), Las Vegas. The complete schedule, from SEC, 4676 Columbia Parkway, Cincinnati 26, Ohio.

A survey conducted by the Conference of State Sanitary Engineers discloses that the United States needs approximately 5,200 new sewage treatment plants, plant enlargements and additions which would cost some two billion dollars. The wastes they would treat are now being discharged into the nation's waters from a population of about 42 million. The survey, completed early this year, included 48 states, the District of Columbia, Puerto Rico, and the Virgin Islands.

The traineeship program of the National Institute of Mental Health was recently extended to include an undergraduate traineeship for registered nurses who graduated from diploma schools of nursing and are interested in a psychiatric-mental health nursing career. Available through schools in the National Mental Health Training Program, the traineeships provide an annual stipend of $1,800, plus tuition and regis-

tration fees. Complete information from Raymond Feldman, M.D., Chief, Training Branch, NIMH, Bethesda, Md.

The new Communicable Disease Center of the University of Kansas School of Medicine, officially named the Maurice L. Breidenthal Laboratory, was dedicated in April. It now houses the Kansas City Field Station of the Public Health Service's Communicable Disease Center. Headquarters for all 13 CDC installations in the nation are in Atlanta, Ga.

The Institute of Physical Medicine and Rehabilitation, New York University Medical Center (400 East 34th Street, New York 16, N. Y.) is again offering three sessions of its four-week course "Advanced Physical Rehabilitation Methods for Physical/Occupational Therapists"—beginning November 13, 1961, and February 5 and April 23, 1962; and three sessions of its three-week "Seminar in Physical Rehabilitation Methods for Nurses"—beginning October 16, 1961, and January 8 and March 26, 1962. Complete details from Edith B. Lawton, Director, Post-Graduate Education for Paramedical Personnel at this institute. . . . Another branch of the NYU Medical Center, the Institute of Industrial Medicine (550 First Avenue, New York 16, N. Y.) is giving a one-week course in industrial health for nurses starting November 6. Registration is limited to 50 nurses engaged in this field. Several sessions will be held jointly with industrial physicians taking postgraduate study. Sara P. Wagner, R.N., and David H. Goldstein, M.D., are co-directors of the course. Details from the Dean, NYU Post-Graduate Medical School at the First Avenue address.

The Corporation of Brown University, Providence, R. I., has authorized university officials to proceed with the development of an academic program and to obtain funds for implementing a six-year program to prepare students as physicians or medical scientists. The graduate of the proposed course would have the equivalent of two years of medical school, at which point he would either transfer to an existing medical school as a third-year student or choose to go into teaching or research in the medical sciences by pursuing two more years of study leading to a Ph.D. degree. The Corporation withheld its decision about the addition of the two clinical years of medical education culminating in the award of an M.D. degree at Brown itself.

The Philadelphia Department of Public Health, through the Air Pollution Control Section of the department's Community Health Services, began a year-long survey in May to determine the relationship, if any, between industrial absenteeism due to certain respiratory ailments and the amount of oxides of sulfur present in the air. The air samples collected will be analyzed by the Division of Air Pollution, Public Health Service, and compared with peaks of respiratory ills at several industries in the area. Results will be publicized periodically. The industrial firms are taking data from personnel reporting to their dispensaries. The data is aimed at delineating the first day of occurrence of symptoms of respiratory ills in the hope that this can best be correlated with pollution levels. Some effort will also be made to ascertain whether the employee's area of residence, i.e., high or low sulfur dioxide area, can be demonstrated to be a correlating factor. Further information from John J. Hanlon, M.D., Director, Community Health Services, Philadelphia Department of Public Health, 500 South Broad St.

PERSONALS

JOHN J. BLOOMFIELD,* sanitary engineer director, Public Health Service, and regional consultant in industrial hygiene, International Cooperation Administration, retired from the PHS in June, after more than 38 years of service. He is now regional consultant in industrial hygiene, Pan American Health Organization, Santiago, Chile.

STELLA L. BRUEGGEN, R.N., with the Illinois Society for the Prevention of Blindness (Chicago) has received the 1961 Mary M. Roberts Fellowship Award in Journalism of the American Journal of Nursing.

LOUIS J. CALISTI, D.D.S.,† formerly director of dental health, Brookline (Mass.) Health Department, is now professor of biometrics and public health and director of dental auxiliary personnel, Tufts University School of Dental Medicine, Boston, Mass.

MARTIN M. CUMMINGS, M.D., formerly chairman and professor, Department of Microbiology, University of Oklahoma Medical School, is now director, Office of International Research, National Institutes of Health, Bethesda, Md.

AVEDIS DONABEDIAN, M.D., M.P.H.,† formerly associate professor of preventive medicine, New York Medical College, is now associate professor of public health economics, Bureau of Public Health Economics, School of Public Health, University of Michigan, Ann Arbor.

JAMES F. DONNELLY, M.D.,* formerly chief, Maternal and Child Health Section, Personal Health Division, North Carolina State Board of Health, Raleigh, is now director of the division.

PHILIP DRINKER, Sc.D.,† formerly professor and head, is now professor emeritus, Department of Industrial Hygiene, Harvard School of Public Health, Boston, Mass.

MARGARET A. DUNHAM,* formerly director, Division of Nutrition, Indiana State Board of Health, is now regional nutrition consultant, Children's Bureau, Charlottesville, Va.

HENRY I. FINEBERG, M.D.,* formerly first deputy commissioner, Department of Hospitals, New York City, is now executive vice-president, New York State Medical Society, a newly created post.

JEAN FRENCH, M.P.H.,† formerly instructor in public health nursing, New York Hospital-Cornell University School of Nursing, has been appointed assistant professor of nursing, College of Nursing, University of Kentucky, Lexington.

FRANCES HEYMANS, formerly nutrition consultant, is now director, Division of Nutrition, Indiana State Board of Health, Indianapolis.

AMY LOUISE HUNTER, M.D., Dr.P.H.,† for more than 25 years director, Bureau of Maternal and Child Health, Wisconsin State Board of Health, Madison, has retired.

CAPTAIN ARTHUR HYMAN (USA),† formerly with the U. S. Army Environmental Health Laboratory, Army Chemical Center, Md., is now with the Department of Preventive Medicine, MFSS, BAMC, Ft. Sam Houston, Tex.

DOROTHY M. JOHNSON,† formerly director of public health nursing, Greenwich (Conn.) Health Department, is now assistant to the director, Home Care Program, Associated Hospital Service of New York (New York City's Blue Cross).

WILLIAM F. KELLOW, M.D., formerly associate dean, University of Illinois College of Medicine, is now dean, Hahnemann Medical College, Philadelphia, Pa.

CHARLES G. KING, Ph.D.,* formerly executive director, is now president, Nutrition Foundation, New York City. Dr. King is president-elect of the APHA.

COLONEL ARTHUR P. LONG, MC, USA (Dr.P.H.)* chief, Preventive Medicine Division, Office of the Army Surgeon General, has retired from the Army after 20 years' service. He will become professor of environmental medicine and co-director, International Center for Medical Research Training, University of California Medical Center, San Francisco, Calif.

JOHN MASON, D.V.M., M.P.H.,† formerly director, Division of Communicable Disease Control, New Mexico Department of Public Health, is now epidemiologist, Malaria Eradication Program, International Cooperation Administration, Djakarta, Indonesia.

KARL F. MEYER, M.D., Ph.D.,* director emeritus, George Williams Hooper Foundation for Medical Research, University of California, has received the 1961 Jessie Stevenson Kovalenko Medal of the National Academy of Sciences for outstanding contributions to medical science.

HUGO MUENCH, JR., M.D., Dr.P.H.,* formerly professor and head, is now professor emeritus, Department of Biostatistics, Harvard School of Public Health, Boston, Mass.

GEORGE A. NEVITT, D.D.S.,* dental director, Public Health Service, formerly with PHS Region VII, Dallas, is now at Dental Health Training Center, PHS Region IX, San Francisco, Calif.

* Fellow.
† Member.

HARRIETT B. RANDALL, M.D.,* formerly assistant medical director, is now director of health education and health services, Los Angeles (Calif.), Board of Education, succeeding MORLEY SELLERY, M.D.,* retired.

ROBERT B. REED, Ph.D., formerly associate professor, is now professor and head, Department of Biostatistics, Harvard School of Public Health, Boston, Mass.

CLOTILDE SANGUINET,* director, Health Education, Indiana Tuberculosis Association, has retired after 25 years of service in ITA.

LESLIE SILVERMAN, S.D., professor of industrial hygiene, is now head, Department of Industrial Hygiene, Harvard School of Public Health, Boston, Mass.

GEORGE W. STILES, M.D., Ph.D.,* of Denver, Colo., retired director, Laboratory Section, Colorado State Department of Public Health, has been elected to the Oklahoma State University Alumni Hall of Fame.

JAMES E. STUART,† president, Blue Cross Association, will receive the American Hospital Association's 1961 Justin Ford Kimball Award for "outstanding encouragement given to the concept of prepaid voluntary health care plans."

JEROME S. TOBIS, M.D.,* formerly professor and chairman, Department of Physical Medicine and Rehabilitation, New York Medical College, is now chief, Department of Physical Medicine and Rehabilitation, Montefiore Hospital, New York City.

MYRON E. WEGMAN, M.D., M.P.H.,* dean, University of Michigan (Ann Arbor) School of Public Health, has been appointed professor of pediatrics and communicable diseases in the Medical School.

GEORGE M. WHEATLEY, M.D., M.P.H.,* third vice-president, Metropolitan Life Insurance Company (New York City), has been appointed medical director of the company.

GEORGE A. WOLF, JR., M.D., formerly dean, University of Vermont Medical College, is now executive director, Tufts-New England Medical Center, Boston, Mass.

ARTHUR H. WOLFF, D.V.M., assistant chief, Research Branch, Division of Radiological Health, Public Health Service, is on a one-year's assignment as special consultant on radioactive materials in food and agriculture to the Atomic Energy Branch, United Nations Food and Agriculture Organization, Rome.

DEATHS

WALTER L. BIERRING, M.D.,* director, Division of Heart Diseases, Chronic Diseases and Geriatrics, State Department of Health, Des Moines, Iowa, on June 25 (Health Officers Section).

JAMES O'LEARY HOOD, M.D.,* of Norman, Okla., on May 5 (Unaffiliated).

* Fellow.
† Member.

CONFERENCES AND DATES

American Public Health Association. Ninetieth Annual Meeting, Miami Beach, Fla. October 15-19, 1962.

Eighty-Ninth Annual Meeting, Detroit, Mich., November 13-17, 1961, and Related Organizations, including:

American Association for Health, Physical Education and Recreation
American Association of Public Health Physicians
American Association of Vital Records and Public Health Statistics
American College of Preventive Medicine
American National Council for Health Education of the Public, Inc.
American Orthopsychiatric Association
American School Health Association (Nov. 11 and 12)
American Society of Professional Biologists, Inc.
Association of Business Management in Public Health
Association of Reserve Officers of the U. S. Public Health Service
Association of Schools of Public Health Inc.
Association of State Maternal and Child Health and Crippled Children's Directors
Association of State and Territorial Public Health Nursing Directors
Association of State and Territorial Public Health Nutrition Directors (Nov. 11-12)
Association of Teachers of Preventive Medicine (Nov. 11)
Canadian Public Health Association, Medical Care Section
Cleveland Health Museum, National Advisory Council
Commissioned Officers Association of the U. S. Public Health Service
Committee on Medical Care Teaching of the Association of Teachers of Preventive Medicine
Conference for Health Council Work
Conference of Health Economists
Conference of Municipal Public Health Engineers
Conference of Public Health Training
Conference of Public Health Veterinarians
Conference of State and Provincial Public Health Laboratory Directors (Nov. 12)

Conference of State and Provincial Health Authorities of North America (Nov. 11)
Conference of State Sanitary Engineers
Conference of State and Territorial Directors of Public Health Education
Group Health Association of America
International Health, International Cooperation Administration
Mental Health and Psychiatric Nurses
Michigan Association of Public Health Dentists
Michigan School Health Association (Nov. 11 and 12)
Military Government-Civil Affairs Public Health Society
National Association of Sanitarians
National Association of Social Workers
National Citizens Committee for the World Health Organization
National Rehabilitation Association
National Tuberculosis Association
Public Health Cancer Association of America
Public Health Service
Social Workers in Health and Welfare Programs
Society of Public Health Educators (Nov. 11 and 12)
U. S. Conference of City Health Officers

Alumni Groups:

California Public Health Alumni Association, University of
Columbia University School of Public Health and Administrative Medicine Alumni
Delta Omega
Harvard Public Health Alumni Association
Johns Hopkins University Alumni
Michigan Alumni, University of
Minnesota, University of
North Carolina School of Public Health Alumni, University of
Toronto School of Hygiene Alumni, University of
Tulane University Alumni
Yale University Alumni

State and Regional Public Health Meetings—August, September, and October:

Florida Public Health Association. Hotel Robert Meyer, Jacksonville. October 5-7.
Maryland Public Health Association. Francis Scott Key Hotel, Jacksonville. October 5-7.
Medical Care Section, APHA. New York City Regional Meeting. McMillin Theater, Columbia University. September 12.
Minnesota Public Health Association. Hotel St. Paul, St. Paul. September 28-29.
Nebraska Public Health Association. Hotel Lincoln, Lincoln. September 21-22.
New Jersey Public Health Association. Asbury Park. October 24.
Oregon Public Health Association. Corvallis. October 18-20.
Pennsylvania Public Health Association. University Park, Pennsylvania State University. August 20-24.
South Dakota Public Health Association. Marvin Hughitt Hotel, Huron. September 20-22.
Tennessee Public Health Association. Hermitage Hotel, Nashville. October 4-6.
Washington Public Health Association. Benjamin Franklin Hotel, Seattle. October 15-17.

Meetings of Other Organizations:

American Academy of Pediatrics. Palmer House, Chicago, Ill. October 2-5.
American Association of Medical Record Librarians. Benjamin Franklin Hotel, Philadelphia, Pa. October 9-12.
American Cancer Society. Biltmore Hotel, New York, N. Y. October 23-24.
American Dental Association. Sheraton Hotel, Philadelphia, Pa. October 16-19.
American Dietetic Association. Sheraton-Jefferson Hotel, St. Louis, Mo. October 24-27.
American Heart Association. Americana Hotel, Bal Harbour, Fla. October 20-24.
American Hospital Association. Atlantic City, N. J. September 25-28.
American Nursing Home Association. Pick-Carter Hotel, Cleveland, Ohio. October 2-6.
American Psychiatric Association. Mental Hospital Institute. Omaha, Neb. October 16-19.
American Veterinary Medical Association. Sheraton-Cadillac Hotel, Detroit, Mich. August 20-24.
Arthritis and Rheumatism Foundation. New York, N. Y. October 3.
Industrial Hygiene Foundation. Mellon Institute, Pittsburgh, Pa. October 25-26.
Inter-American Conference on Occupational Medicine and Toxicology, Third. Biscayne Terrace Hotel, Miami, Fla. August 6-10.
International Conference of the International Medical Association for the Study of Living Conditions and Health (Third). St. Vincent, Aosta Valley, Italy. September 29-October 1.
International Union for the Scientific Study of Population. Loeb Student

Center, New York University, New York, N. Y. September 11-16.

Middle Eastern-Mediterranean Paediatric Congress, Second. Hacettepe, Ankara. September 6-9.

Muscular Dystrophy Associations of America. New York, N. Y. October 10.

National Association for Retarded Children. Sheraton Palace, San Francisco, Calif. October 11-14.

National Council on Family Relations. University of Utah, Salt Lake City, Utah. August 23-25.

National Council on the Aging. New York, N. Y. October 16-17.

National Recreation Association. Detroit, Mich. October 1-6.

National Rehabilitation Association. Whitcomb Motor Hotel, San Francisco, Calif. October 1-3.

National Safety Council. Conrad Hilton Hotel, Chicago, Ill. October 16-20.

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DIRECTORY OF TECHNICAL EXHIBITS

89th Annual Meeting

Detroit, Michigan **Cobo Hall** ***November 13-16, 1961***

American Journal of Nursing Co., New York, N. Y., Booth 622.

American Sterilizer Co., Erie, Pa., Booth 138.

Association Conventions Exhibits, New York, N. Y., Booth 137.

†B-D Laboratories, Inc., (B-B-L, Cappel & Falcon Divisions) Baltimore, Md., Booths 619 and 620.

Becton, Dickinson & Co., Rutherford, N. J., Booth 604.

Bittner Corp., New York, N. Y., Booth 202.

Breon Laboratories, Inc., New York, N. Y., Booth 712.

Case Laboratories, Inc., Chicago, Ill., Booth 811.

†Cereal Institute, Inc., Chicago, Ill., Booth 102.

Certified Blood Donor Service, Jamaica, N. Y., Booth 612.

Chicago Dietetic Supply House, Inc., Chicago, Ill., Booth 820.

Chicopee Mills, Inc., New York, N. Y., Booth 614.

Chilean Iodine Educational Bureau, Inc., New York, N. Y., Booth 609.

Chrysler Corp., Detroit, Mich., Booths 611 and 511.

Chrysler Corp., Dodge Car and Truck Division, Detroit, Mich., Booths 610 and 512.

The Coca-Cola Co., Atlanta, Ga., Booth 812.

Cuno Engineering Corp., Meriden, Conn., Booth 618.

D'Armigene, Inc., Lindenhurst, N. Y., Booth 201.

† See advertisement(s) in this issue.

†Difco Laboratories, Detroit, Mich., Booth 701.

The Diversey Corp., Chicago, Ill., Booth 520.

Economics Laboratory, Inc., St. Paul, Minn., Booth 502.

EMKO Co., St. Louis, Mo., Booth 809.

Encyclopaedia Britannica, Inc., Chicago, Ill., Booth 807.

Encyclopedia Americana, Grand Rapids, Mich., Booth 224.

Engelhard Hanovia, Inc., Hanovia Lamp Division, Newark, N. J., Booth 617.

Everpure, Inc., Chicago, Ill., Booth 803.

Florida Citrus Commission, Lakeland, Fla., Booth 510.

Fluoritab Corp., Flint, Mich., Booth 715.

Ford Division of Ford Motor Co., Dearborn, Mich., Booths 822 and 823.

Galvanized Ware Manufacturers Council, Chicago, Ill., Booth 821.

Great Books of the Western World, Southfield, Mich., Booth 506.

Hack Shoe Co., Detroit, Mich., Booth 902.

Health Insurance Council, New York, N. Y., Booth 403.

Heinicke Instruments Co., Hollywood, Fla., Booth 713.

Heublein, Inc., Hartford, Conn., Booth 602.

Hobart Manufacturing Co., Troy, Ohio, Booth 813.

Intercontinental Scientific Corp., Booth 513.

Johnson & Johnson, New Brunswick, N. J., Booth 721.

Kimberly-Clark Corp., Neenah, Wis., Booth 501.

DIRECTORY OF TECHNICAL EXHIBITS (cont.)

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†Kimble Glass Co., Toledo, Ohio, Booth 601.

Lehn & Fink Products Corp., Toledo, Ohio, Booth 608.

Licensed Beverage Industries, Inc., New York, N. Y., Booth 722.

The Lorvic Corp., St. Louis, Mo., Booth 810.

The Macmillan Co., New York, N. Y., Booth 724.

Maico Electronics, Inc., Minneapolis, Minn., Booth 816.

Medical Coaches, Inc., Oneonta, N. Y., Booth 507.

Medical Film Guild, Ltd., New York, N. Y., Booth 907.

Merck Sharp & Dohme, West Point, Pa., Booth 621.

Microbiological Associates Inc., Washington, D. C., Booth 817.

Miles Reproducer Co., Inc., New York, N. Y., Booth 109.

Millipore Filter Corp., Bedford, Mass., Booth 906.

The C. V. Mosby Co., St. Louis, Mo., Booth 519.

National Aniline Division, Allied Chemical Corp., New York, N. Y., Booth 521.

National Dairy Council, Chicago, Ill., Booth 616.

National Live Stock & Meat Board, Chicago, Ill., Booth 824.

Nuclear Industries, Inc., Valley Stream, N. Y., Booth 422.

Hermien Nusbaum & Associates, Chicago, Ill., Booth 814.

Ortho Pharmaceutical Corp., Raritan, N. J., Booth 718.

†Panray Corp., New York, N. Y., Booth 324.

Paper Cup & Container Institute, Inc., New York, N. Y., Booths 702 and 703.

† See advertisement(s) in this issue.

†Parke, Davis & Co., Detroit, Mich., Booth 801.

Pennsalt Chemicals Corp., Philadelphia, Pa., Booth 603.

Pepsi-Cola Co., New York, N. Y., Booths 111 and 112.

†Pfizer Laboratories, Division of Chas. Pfizer & Co., New York, N. Y., Booth 518.

Pharmaceutical Manufacturers Association, Washington, D. C., Booth 815.

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Professional Tape Co., Inc., Riverside, Ill., Booth 623.

Ross Laboratories, Columbus, Ohio, Booth 802.

W. B. Saunders Co., Philadelphia, Pa., Booth 101.

R. P. Scherer Corp., Hypospray Division, Detroit, Mich., Booth 421.

School Health Supply Co., Forest Park, Ill., Booth 723.

Scientific Equipment Manufacturing Corp., New York, N. Y., Booth 806.

Sealright Co., Inc., Fulton, N. Y., Booths 705 and 706.

The Seven-Up Co., St. Louis, Mo., Booths 804 and 805.

Sterwin Chemicals, Inc., New York, N. Y., Booth 404.

Tampax Inc., New York, N. Y., Booth 825.

Tassette, Inc., Stamford, Conn., Booth 615.

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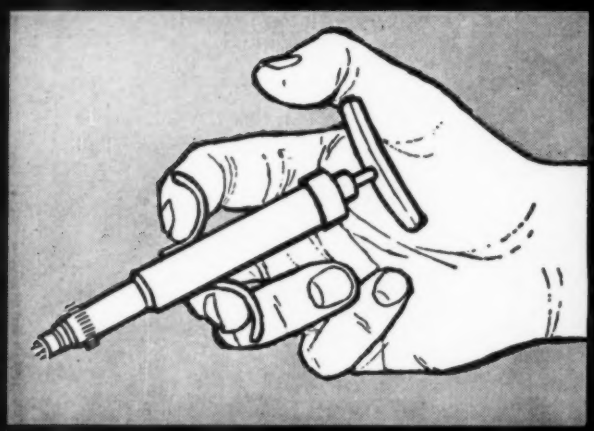

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CANCER: PROGRESS TOWARD PREVENTION AND CONTROL

AMERICAN
Journal
of Public
Health
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NATION'S HEALTH

PREPARED IN
TWO PARTS—PART II

CANCER: PROGRESS TOWARD PREVENTION AND CONTROL

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These papers were presented before the Association Symposium at the Eighty-Eighth Annual Meeting in San Francisco, Calif., November 4, 1960.

The publication of this symposium was aided by contract funds from the Cancer Control Program, Division of Chronic Diseases, Public Health Service, Department of Health, Education, and Welfare, Washington, D. C.

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N. Y., August, 1961

CANCER: PROGRESS TOWARD PREVENTION AND CONTROL

INTRODUCTION

No one would deny that cancer is today a major health problem in the United States. Research into the nature of this problem has increased vastly during recent years, yet our understanding of the etiology of cancer has grown slowly. In part, this is no doubt due to the circumstance that cancer is not a single morbid entity, but is rather a group of diseases. Obviously, if knowledge of the etiology were reasonably adequate, prevention would be the major focus of attention. This is possible where specific carcinogenic agents have been discovered. In other instances, however, one must depend on the discovery and treatment of precancerous lesions, while in still others thorough treatment is the major objective. It is along the latter lines of endeavor that important advances have occurred. The symposium which was held at the San Francisco meeting of the Association and which we present here reviews the current situation and draws the implications for action. While research must continue, it is clear that there is knowledge now available which can be put to use. This is a public health task.

The Editor

THE TOTAL EFFORT AGAINST CANCER

Kenneth M. Endicott, M.D.

CANCER is the second cause of death in the United States today, taking 260,000 lives a year. There are 500,000 new cases diagnosed each year, and at any given time there are 700,000 persons under treatment for cancer in this country. The combined hospital bill alone for cancer patients is $300 million a year, and the total economic impact of the disease is $12 billion a year in lost goods and services.

Statistical studies offer the conclusion that, if present trends continue, approximately 40 million persons now living will develop cancer during their lifetime, and 26 million will die of it. How has this trend developed, and how is it moving? In 1900 cancer was in seventh place on the mortality list, outranked in ascending order by accidents, nephritis, diarrhea, pneumonia, tuberculosis, and cardiovascular diseases. Now, it is outranked only by the cardiovascular complex.

Because cancer tends to select its victims at the upper age levels, its increase during the last 60 years has been largely among people who have survived other disease hazards and arrived at the time of life for greatest risk to malignant attack. Some of the increase is justifiably attributed to better case finding and improved diagnosis. But there has also been an increase that is unaccounted for, though nevertheless real, which amounts to at least 10 per cent. In the course of the general rise of cancer, there have also been some interesting and undoubtedly significant variations by specific sites. In the last 25 years, for instance, there has been a sixfold increase in lung cancer among males, a twofold increase in leukemias and other lymphomas, a 30 per cent decrease in the incidence of stomach cancer, and a decrease of 40 per cent in mortality from cancer of the uterus in white women and 25 per cent in Negro women.

Happily, there has been a gradual improvement in the over-all cancer survival picture over the years. At the turn of the century a cancer victim had little hope of getting well. Twenty years ago one out of four was being saved. At the present time one out of three is being saved, and it has been said many times that we ought to be able to save half of all cases with what we know about cancer today.

Several factors have contributed to this improvement. Better case finding and diagnosis, backed by professional and lay education and public health efforts, have had a lot to do with it, and these efforts should be continued and redoubled. But the one thing most responsible for increased survival of cancer patients is better treatment. A study covering a 17-year period conducted in Connecticut by the State Health Department and the National Cancer Institute shows that in the period from 1935 to 1951 the five-year survival rate increased from 19 to 25 per cent for males, and from 29 to 38 per cent for females.

What is the scope of the present total

effort against cancer? National support has risen rapidly. In 1940, for instance, the appropriation for the National Cancer Institute was $570,000 and the American Cancer Society received $210,000 in public contributions. For the fiscal year 1961 the Institute's appropriation is $111 million, and the Cancer Society is operating at a level of about $35 million.

Before such a distinguished audience as this, I need only mention the major efforts now being made. The splendid program of lay and professional education developed by the American Cancer Society is well known. The American College of Surgeons through its Committee on Cancer is doing much to improve the care of cancer patients. Federal, state, and local health departments are moving rapidly to develop cancer control programs and due recognition of the progress was taken last night when Dr. Breslow received a Lasker Award for the achievements of his Bureau of Chronic Disease Control.

The research effort now in progress has a heavy emphasis on fundamental biology, and there are exciting developments in understanding the chemistry of genetics. There is also a massive drug development program and an intensive effort to determine whether viruses may not be the cause of human cancer.

But our efforts are still much too weak in areas such as clinical research, epidemiology, and particularly in the detection and suppression of carcinogens in our environment.

The meaning of the total effort against cancer becomes clear with an understanding of the different fronts on which it must be made. It becomes evident that all those concerned with public health, and therefore vitally concerned with cancer, are going to have to face up to some serious problems requiring combined social action. Some of them are going to require changes not only in our laws but even in our social customs if we are going to eliminate cancer as a cause of morbidity and death.

One potentially important breakthrough in cancer is the possibility of reducing lung cancer deaths, especially in the male population where there has been such an alarming increased incidence in the last 30 years. Here, we run head-on into the smoking controversy and the question of whether to tell people not to smoke. The Public Health Service believes that the weight of scientific evidence implicates smoking as the principal etiological factor in the increased incidence of lung cancer. Lung cancer is increasing more rapidly and is causing more deaths than any other form of cancer in the adult male population. There is sound reason to believe that if smoking—particularly cigarette smoking—were to be eliminated from our mores, lung cancer mortality in this country would be reduced at least 60 per cent with a consequent saving of 20,000 lives a year.

Another area demanding social action is better care for the patient with advanced cancer. Metastatic cancer is no longer a disease to be treated by opiates and neglect. Today we can offer hormone therapy, drug therapy, palliative surgery, palliative radiation; good general care and at least temporary rehabilitation for many patients. As physicians and public health workers, it is our duty to do so. As a society, it is our duty to find a way to pay the bills.

Fortunately, my job relates mostly to research, and I hope you will pardon my enthusiasm for getting on with the research job. At the present time there is a substantial research program in the cancer field and much of it is relatively new. Certainly, many of the research projects now under way will fail, in the sense that the results will be negative or inconclusive. Many other projects will yield results which are interesting from an intellectual standpoint but

which will contribute little to the immediate solution of the cancer problem. Only a few studies now in progress will be remembered a hundred years from now. This is not an apology for the present scope of the cancer research effort, but rather a simple statement of fact. There are those who would say that we are devoting too much of our resources to research on the cancer problem and that we have exceeded our national intellectual manpower capacity for productive work in this field. This I doubt. It seems to me that biological and medical research is only now beginning to emerge from the horse-and-buggy stage. We must look to the physical and engineering sciences to see what can be done with aggressive research and development. To be sure, this is not accomplished overnight. Our nation has always had more than its share of men with inventive minds in the mechanical field, and there has always been the strong thrust of the profit motive in the area of the physical sciences. But, whatever the reasons, the United States has achieved a position of pre-eminence in the physical and engineering sciences.

This phenomenon is now being repeated in biology and medicine, but the motives are somewhat different here. The gains are less for the inventor and more for society. One can scarcely expect the bulk of biological and medical research to be financed by industry and private capital since there is little opportunity for return on the investment.

This is well borne out in our experience with drug development in the cancer field. Although several companies have financed modest cancer drug development programs with their own funds, it was not until the National Cancer Institute began to subsidize cancer drug research that the large industrial research programs of today were launched. Whether any of the companies now involved in this massive program will ever recover their own investments, as a result of sales of products to be developed, is moot.

But what is to be done in those areas where there is little or no opportunity for the development of productive enterprises? To be more specific, what is to be done in those areas of cancer research which relate to eliminating carcinogens from the environment? There are several recent examples fresh in the memory of most of us in which the elimination of chemical carcinogenesis has wreaked havoc on industry—and things will get worse before they get better. Ahead lie decades of painstaking research and testing in order to establish with scientific certainty which of the hundreds of thousands of organic chemicals pouring forth from chemical research may be safely admitted to our environment, and it is important that as many as possible be admitted where they accomplish miraculous things. Someone must pay the bill and I am sure the chemical industry will bear its fair share, but ultimately society must bear the major share whether through private donation or taxation.

Expenditures for cancer research have increased tenfold in the past few years. This general trend should, and I am convinced, will continue in the future. Men of genius will be found to do the research and somehow we will find a way to put the necessary tools in their hands.

This will not and must not be the sole responsibility of the federal government. Even more intensive effort must be made by all of us to stimulate private giving to such splendid organizations as the American Cancer Society. State and local governments must increase their support to the growing number of universities and institutes which are striving to develop better cancer research and cancer control programs. Clinicians and others in daily

contact with cancer patients, their families, and friends must encourage private giving and bequests. If all this is done, we can look forward confidently to a sound, stable, diversified, and expanding research attack on the cancer problem.

It is true that there is no great surplus of trained research manpower. Personally, I hope there never is, for this is a luxury we can scarcely afford. As you know, the American Cancer Society and the National Cancer Institute have always devoted substantial funds to the training of scientific manpower. These efforts will continue to increase, but I cannot leave the subject of manpower without making a few comments on related needs.

The young people of today are fortunately more sophisticated than many of us were in our youth. Before committing themselves to a career, they reasonably ask what it holds for them, and they balance the possible gains against the certain costs in terms of time and personal resources. At the present moment, careers of research in biology and medicine are weighed and found wanting. Until society can devise sound means for making such careers more attractive, progress will continue to be seriously hampered for want of manpower. It is in this area of creating positions of security and respect for scientists that state and local governments, as well as private philanthropy, have the major role to play. I am sure these segments of our society will find the way.

Before closing, I feel I must draw your attention to the international aspects of cancer research. In country after country, as the infectious and contagious diseases are brought under control through the application of modern technics, the cancer problem begins to loom larger and larger. There is a steady stream of physicians and public health experts from foreign lands to my office, who tell the same story. They look to the United States for research progress but, to an ever-increasing extent, they desire to become active participants in the research. Even the Iron Curtain is easily penetrated in this area. A few weeks ago, a mission of five outstanding Soviet scientists visited the Sloan-Kettering Institute in New York and the National Cancer Institute in Bethesda to discuss areas of mutual interest in cancer research. Next year, a group of United States scientists will visit Russia for the same purpose, and we are well along in planning exchanges of scientists for longer periods of time. Under the aegis of the International Union Against Cancer and the World Health Organization, substantial international efforts are being made to study cancer in human populations. In the beginning, we must expect to provide a lion's share of the manpower and resources for such studies, but I am confident that other nations will wish to take an increasing share of responsibility as time goes on.

In addition to these truly international organizations, there are opportunities for much progress in bilateral efforts between the United States and various individual countries. This year, for the first time, we are able to finance cancer research in foreign lands with the use of blocked currencies which have accumulated in various countries as the result of the sale of surplus agricultural commodities. Still another promising avenue is being opened this year by the National Institutes of Health through the creation of a series of university-based networks for medical research and medical training related to international health. A typical program will involve a grant to a major university in the United States, which will develop an intensive research and training program, and affiliate itself with one or more strong, or potentially strong, research institutes in foreign

lands with a view to collaboration in research and the training of research and technical manpower.

In closing, I wish to reiterate several major points:

1. Cancer is one of our great public health problems, but it is not hopeless and much progress already has been made.

2. We are already in possession of knowledge which, if vigorously applied in the day-to-day practice of medicine and public health, can further reduce cancer morbidity and mortality.

3. In the years immediately ahead, there must and will be expanded efforts in the research area both nationally and internationally, and we in the public health profession must do our utmost to bring this about.

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CURRENT ASPECTS OF CANCER RESEARCH

Gerald C. Mueller, M.D., Ph.D.

THROUGH basic research, progress in the attack on cancer has been remarkably rapid in the past several years and continues at an encouraging and accelerating pace. It is the goal of this presentation to appraise some of the recent experimental developments which give us particular cause for optimism concerning the ultimate solution of the cancer problem.

Experimental Cancer Systems

A major factor in the understanding of medical problems in the past has been the ability to study the disease entity under controlled conditions. From such research have come the revolutionary advances in medical science: the vitamins, hormones, and antibiotics currently in use. Concerning this aspect of the cancer problem we are presently in an unusually favorable position, as we can now reproduce the disease easily under laboratory conditions. Table 1 lists certain examples from a variety of agents which will induce cancer with a high degree of predictability. Practically any type of tissue retaining the potentiality for growth can be made the site of the malignant action. In perusing this list it is immediately apparent that the agents are extremely diverse, ranging from simple inorganic chemicals through the more complex organic molecules to the very specific macromolecular entities, the viruses. Considering this range of agents and the variety of sites affected we come to the realization that cancer can be viewed most profitably as a family of diseases rather than a single entity. Despite this likelihood, cancer cells from all malignant states exhibit certain common characteristics which are presented in Table 2 and which usually are responsible for the course of the disease.

The most basic asset of the cancer cell is its reproductive advantage over its normal cell of origin, particularly when it has been thrust into a new extracellular environment. Without this attribute there could be no cancer problem. This does not mean that cancer cells are always the most rapidly growing cells in the body; to the contrary, certain cells from the crypts of the intestine or the bone marrow may actually reproduce just as fast or faster than tumor cells. However, as the normal cell migrates into a new cellular association or if the extracellular environment about it is changed for any reason such as with the alteration of the level of a particular hormone, it will adapt to this change with a curtailment of cell reproduction. On the other hand the malignant cell either adapts differently or fails to adapt, thereby permitting the continued production of progeny.

It is the research toward the elucidation of this essentially qualitative difference between the cancer cell and the normal cell which offers most hope for a solution to the cancer problem.

The Carcinogenic Process

Inferred in the above discussion is the conclusion that cancer cells breed true and that a part of the malignant transformation affording them a repro-

Table 1—Examples of the Variety of Carcinogens

Inorganic
Selenides
Chromates
Organic
Polycyclic aromatic hydrocarbons: (3, 4 benzpyrene)
Aromatic amine and aminoazo dyes: (2 acetylamino-fluorene and 4 dimethylaminoazobenzene)
Alkylating agents: (N-stearoyl ethylenimine)
Ethyl carbamate
Ethionine
Tannic acid
Viruses
Leukosis (fowl)
Sarcoma (fowl)
Kidney carcinoma (frog)
Papilloma (rabbit)
Mammary carcinoma (mouse)
Leukemia (mouse)
Polyoma (mouse, hamster)
Radiation
UV Light
Alpha-, beta-, gamma-, and x-ray

ductive advantage involves some change in genetic character or in the mechanism for expression of specific genetic factors. While this is not yet an established fact, studies on the mechanism of carcinogenesis support this general concept. The work of Boutwell, Rusch, and others has demonstrated that a very small amount of carcinogenic hydrocarbon such as dimethylbenzanthracene can produce in a single brief contact an irreversible or persistent change in the skin of the mouse. In itself, this change does not yield a cancer, but if provoked by a subsequent, delayed application of the proper promoting agent, a tumor will arise at this site.[1-3]

As an example of this situation Figures 1 and 2 present two groups of mice, both of which received a single application of 10 micrograms of dimethylbenzanthracene to initiate the carcinogenic process. The group of animals without tumors received no further treatment, whereas the tumor-bearing group shows the effect of a subsequent treatment with a promoting agent, croton oil. While the croton oil alone did not produce cancer it did "promote" the development of those tumors incited by a small initiating dose of the carcinogen, dimethylbenzanthracene.

Similarly in Figure 3 the promoting action of skin wounding on tumor formation is demonstrated. It is to be emphasized that we now know numerous promoting agents, some of which are common chemicals such as phenols, detergents, and surface active agents. Their action is, however, separate and distinct from that of the primary carcinogen.

Studies of this type demonstrate that the carcinogenic process can consist of multiple or sequential events. Thus it is quite possible to encounter carcinogenic stimuli which do not lead to the production of tumors or to encounter promoting factors without serious consequences. Unfortunately the opposite situation is also true; and since both such factors are becoming increasingly prevalent in our everyday lives it is necessary to elucidate further these relationships if we are to live with the minimum of hazard.

Table 2—Characteristics of the Cancer Cell

1. The Cancer Cell exhibits a reproductive advantage over the normal cell of origin.
2. The Cancer Cell exhibits a great potentiality for dissociating from one cellular environment and setting up a new growth at another site.
3. The Cancer Cell is endowed with a high capacity for change which leads to adaptation and selection toward greater malignancy.

Figure 1—The mice received a single application of 10 micrograms of dimethylbenzanthracene followed by one drop of benzene once a week for 12 weeks. Note that this sequence does not give rise to tumors. (Photo provided by Dr. R. K. Boutwell.)

Figure 2—The mice received a single application of 10 micrograms of dimethylbenzanthracene followed at weekly intervals for 12 weeks with one drop of a 0.5 per cent solution of croton oil dissolved in benzene. Note the large numbers of tumors which have arisen on the backs of the mice. Croton oil alone did not produce tumors under these conditions. (Photo provided by Dr. R. K. Boutwell.)

A question which is always asked in studies on cancer production is: How does the carcinogen act? It is self-evident that knowledge of the molecular interactions of the carcinogenic agent with essential cellular constituents would go a long ways toward the elucidation of the mechanism of cancer production. In studies with the azo dye, dimethylaminoazobenzene, Miller and Miller have demonstrated a protein-bound form of this agent at the site of cancer production which correlates well with its carcinogenic potency and that of various derivatives.[4] Similarly protein-bound forms of other widely active carcinogens such as benzpyrene, dibenzanthracene, dimethylbenzanthracene, and acetylaminofluorene have been demonstrated.[4,5]

With the latter compound a special inquiry has been made as to the molecular form of the active carcinogen.[5] These studies have revealed a new biochemical process in which the nitrogen group of acetylaminofluorene is hydroxylated (i.e., N-hydroxylation) (Figure 4). This metabolite is more active as a carcinogen than the parent compound and is active at a greater number of sites (Figure 5). Since this is such a distinctive metabolite, further studies should be facilitated and should point out more clearly those interactions with cellular constituents which are of importance to the carcinogenic process.

While there are many unsolved as-

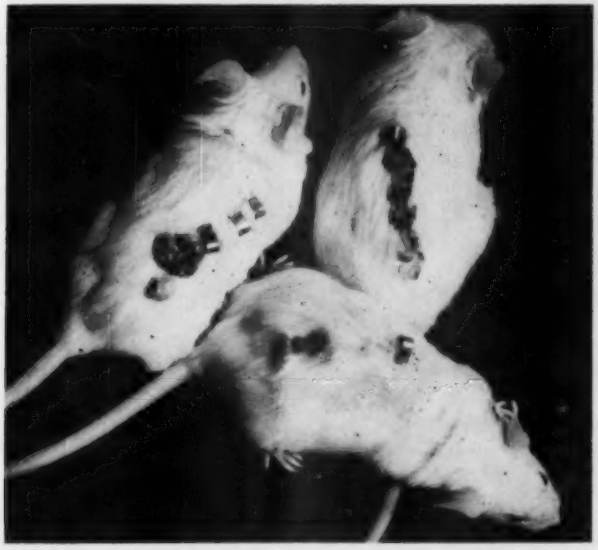


Figure 3—The mice received a single application of 10 micrograms of dimethylbenzanthracene followed at weekly intervals for five weeks with one drop of a 0.5 per cent solution of croton oil dissolved in benzene. The animals were then wounded by a skin incision which was allowed to heal with wound clips in place. Note the localization of the tumors along the incision line at 12 weeks. Very few tumors arose on the backs of mice receiving croton oil for five weeks, but not wounded. Wounding in the absence of the croton oil pretreatment was ineffective. (Photo provided by Dr. R. K. Boutwell.)

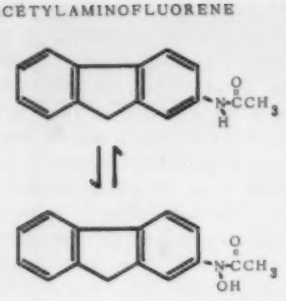


Figure 4—The structural formulas for acetylaminofluorene and the N-hydroxylated derivative

pects of this work, it is apparent that the model systems are gradually yielding to the inquisition. It is expected that the information derived from these studies will be of great value in understanding the genesis of human cancer and in gaining control over it.

Viruses and Experimental Cancer

An exciting and rapidly expanding area of current cancer research concerns the role of viruses in cancer. As the result of new technological advances and the improvement of general tissue culture procedures, a number of animal tumors have now been shown to have a viral etiology. The best resolved tumor-virus systems include the Rous, polyoma, mouse leukemia, and the mouse mammary tumor virus systems. The infectious agents have been shown to represent both classes of viruses: those containing desoxyribonucleic acid and those containing ribonucleic acid as the hereditary material.

A major attribute of the viruses as carcinogens lies in their high efficiency in producing the malignant transformation. In the case of the Rous virus the infection of a fibroblast with a single particle transforms it within a few hours into a fully malignant sarcoma cell. This transformation is attended by a morphologic alteration of the cell which permits the recognition of the newly formed tumor cells.[6] Using these principles for an assay it has been possible to study the infection process in considerable detail. In Figure 6 a focus of virus infection on a monolayer of chick embryo fibroblasts is revealed as a pile-up of round, refractile cells.

From studies of the changes in morphology and growth patterns of the infected cells it is evident that the virus endows the host cell with new properties which must in some manner be related to the malignant change. Present research inquires into the nature of these changes. There are some indications that the relationship of the virus to the host cell is a very subtle one and possibly one involving a close association of both genomes.[7] Progress in this area awaits a better understanding of virus-host cell interaction in general, but with particular respect to the manner in which the virus assures its own duplication and the manner in which it influences the reproduction of host cell constituents.

Viruses as Causative Agents

With a significant number of different types of tumors in a variety of animals traced to a viral etiology it is only natural to inquire how extensive a role do viruses play in the causation of cancer. In animals there are many tumors in which, despite careful studies, it has not been possible to demonstrate a virus etiology. This is particularly true for chemically induced tumors. Accordingly it would appear that tumors in animals may be incited by a variety of agents of which a virus is a single example. However, simply observing some of the complexity of the existing

systems should prompt the maintenance of an open mind on this subject.

With respect to the role of viruses in human cancer it can only be stated at this time that there is no conclusive evidence indicting a virus as a causative agent for human cancer. However, many studies are in progress to test this possibility exhaustively; and much emphasis in these efforts is placed on acute leukemia, Hodgkin's disease, and certain intestinal malignancies in which the character of the clinical disease is suggestive of a viral process. A positive finding would have obvious implications for both the therapy and prevention of the particular malignant state.

The Cell Reproductive Cycle

In the discussion so far the cell has been dealt with mainly as the recipient of a carcinogenic stimulus; let us now consider briefly the cell response. As stated earlier, the cancer cell expresses a malignant transformation by the acquisition of a reproductive advantage over the normal cell. It is therefore of

Figure 5—An example of the multiple peritoneal tumors induced by N-hydroxy-acetylaminofluorene. This rat received 6 mg of the carcinogen three times a week for three months at which time many tumors were evident. This agent also has been shown to produce tumors of the liver, ear duct, mammary gland, small intestine and the forestomach. It is more active as a carcinogen than the parent molecule (Figure 4). (Photo provided by Dr. J. A. Miller.)

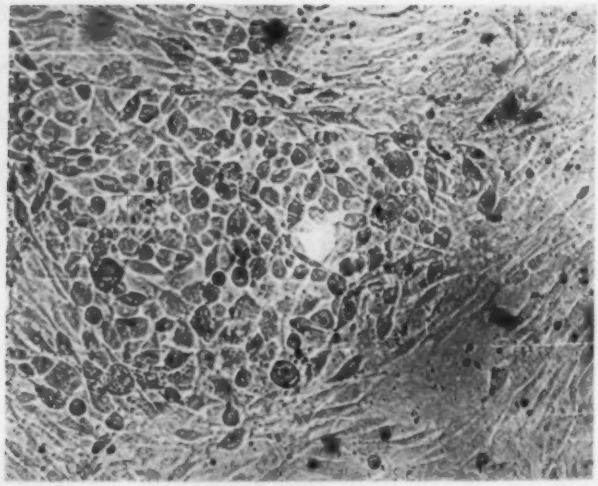
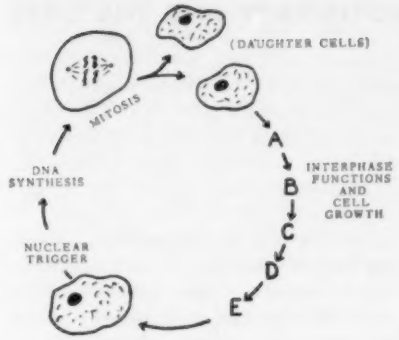


Figure 6—A foci of tumor cells resulting from the infection of a chick embryo fibroblast with a single infectious particle of Rous virus. Note the group of round refractile sarcoma cells which result from the growth of infected cells and the spread of the infection to adjacent cells. The normal fibroblasts are evident at the periphery of the monolayer. (Photo provided by Dr. H. M. Temin.)

great importance to elucidate some of the regulatory processes which can restrict the frequency at which cells replicate.

For such studies a cell can be considered to proceed around a cycle on the way to the generation of two new daughter cells; these in turn re-enter this same cycle as illustrated in Figure 7. In a tissue culture cell such as HeLa with a generation time of 24 hours, approximately 30 per cent of the time is spent in the process of synthesizing its nuclear apparatus and the carrying out of the mitotic process. The rest of the time (16 hours) is consumed in passing through the hypothetical steps indicated by A, B, C, D, and E. In the case of most normal cells in situ such as those present in the liver, kidney, lung, etc., the reproductive cycle may take weeks, months, or even years. However, once the nuclear synthesis has been initiated in these cells the time involved for the completion of this process is of a similar order to that observed in our fastest replicating animal cells. It is therefore indicated that the prolonged cycle of normal cells results from a hold up or extension of the interphase period represented by the letters A through E.

Unfortunately we know very little of the events in the interphase period which lead up to and trigger the synthesis of the nuclear apparatus. Studies in our laboratory have revealed that an important accomplishment of this period is the synthesis of a specific protein which is involved in converting the desoxyribonucleic acid of the chromosomes into a state which is competent for duplication of this genetic material. It is anticipated that further investigation of this area will elucidate the reasons for the all or none character



CELL CYCLE

Figure 7—A diagram of the reproductive cycle of a mammalian cell. Symbols A-E represent hypothetical stages or barriers which have to be overcome in the progress of the cell toward the initiation of a nuclear synthesis phase

of this process and point up the manner in which agents such as carcinogens, hormones, and viruses are able to modify this process.

It is suggested that investigations in this area are of the greatest importance to the design of chemotherapeutic agents against cancer; such agents might be expected to have a selective therapeutic effect characterized by a physiological regulation of cell growth rather than a generalized toxicity for all rapidly growing cells as do our present anticancer compounds.

In summary, it is highly encouraging to note the rapidity at which the various areas of fundamental research in cancer are developing. While the problem is as intricate as life itself, there is abundant evidence to encourage us in our conviction that it is yielding to the dissective approaches of modern biochemistry and biophysics.

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NEW DEVELOPMENTS IN CHEMOTHERAPY AND THE CARE OF THE CANCER PATIENT

Sidney Farber, M.D.

IMPORTANT progress leading to the early diagnosis of many forms of cancer, combined with public education and the constantly increasing skill of surgeons, radiotherapists, and their professional colleagues, contributed to the achievement by 1950 of actual cures in one out of four patients with cancer. It is generally agreed that no further decrease of large dimension in the number of deaths from cancer may be expected from further improvements in the technics of surgery and radiotherapy alone. For the successful treatment of the many thousands of patients with solid tumors who cannot be cured by surgery and radiotherapy alone, and for the cure of patients with forms of cancer which are disseminated usually from onset, such as Hodgkin's disease, lymphoma, and leukemia, new forms of treatment had to be found. The chemotherapy of cancer is today a reality—imperfect, not always specific or constant in effect, and still short of the final goal—but nevertheless a reality.

It is now 20 years since recognizable important clinical improvement in patients with cancer of the prostate was produced by female sex hormone, to be followed two years later by similar temporary success in the treatment of women with cancer of the breast by testosterone. Fourteen years have elapsed since nitrogen mustard produced profound improvement in some patients with Hodgkin's disease. The first antimetabolite—the folic acid antagonist, aminopterin—to demonstrate anticancer properties was proved capable in 1947 of producing complete remissions in acute leukemia in children. Thus within the last 20 years the dream of centuries was realized in the achievement of destruction of cancer in man by chemical substances introduced into the human body.

If we assume that cancer is caused by a virus acting by virtue of its chemical content and structure, or by a chemical associated with a virus, or one of any other association or origin from outside or inside the body, chemotherapy ideally would be concerned with the correction of an intracellular chemical abnormality. Such a disorder might be characterized by molecular excess or deficiency, or by a disturbance in arrangement of the biochemical pattern required for normal division and function of the cell. Such chemotherapy represents an ideal goal—a specific, gentle, subtle correction of the biochemical disorder which is cancer. Required for such an achievement would be the recognition of the presence of such a biochemical disorder responsible for cancer, hopefully before the actual formation of a tumor mass, by means of an accurate, simple, inexpensive, rapidly performed diagnostic test (still to be discovered) which can be carried out on a mass basis. Neither of these goals has been achieved but impressive progress has been made.

Many forms of cancer, both disseminated and localized, may be destroyed at least temporarily by one or another of many different agents—chemicals, hormones, antibiotics, and plant extracts—which are in use today, a few in the every-day practice of medicine, but most

still restricted to institutions concerned with cancer research and treatment. These agents have come from laboratories and research institutes in many parts of the world. Under the Cancer Chemotherapy National Program in the National Cancer Institute, which has grown so rapidly and effectively in the past five years under the administrative guidance of Dr. Kenneth Endicott, and now Dr. Stuart Sessoms and their colleagues, there are now under actual clinical study in cooperative programs in many parts of our country some 78 new chemical agents gleaned from the study of many thousands of candidate chemical compounds and new antibiotics, as well as 78 synthetic hormone analogues, synthesized and made available by the pharmaceutical industry in the hope that these, too, might have valuable anticancer properties.

It is my task to summarize briefly the various classes of chemical compounds which have proved to be at least temporarily effective in the treatment of cancer in man, and to assess the progress in the chemotherapy of human cancer. Some of these chemicals have increased greatly the period of survival of patients with "incurable" or advanced cancer, and have been responsible for reduction in pain and return at least for months, and sometimes years, to a condition approaching the normal in a small and now growing number of patients. Actual cures have been obtained when chemotherapy applied at a fortunate moment has made possible the more effective use of surgery and radiotherapy as part of total care. During the past 12 to 15 years clinically important temporary effects (from months to a few years) have been produced by chemical agents in the following categories:

1. Male and female sex hormones and their analogues in the treatment of cancer of the breast and prostate.

2. Antimetabolites (methotrexate, 6-mercaptopurine) in the treatment of acute leukemia and lymphoma.

3. Corticosteroids in the treatment of lymphoma, leukemia, cancer of the breast.

4. Nitrogen mustard and oral alkylating agents, such as thioTEPA, chlorambucil, cyclophosphamide, myleran, melphalen or sarcolysin, in the treatment of Hodgkin's disease, members of the lymphoma and chronic leukemia group of tumors, and also in the treatment of certain solid tumors with metastases, such as those of the ovary, the testis, the lung, the bones, the breast, the brain, and malignant melanoma.

5. The newer antimetabolites—nucleic acid inhibitors—such as 5-fluorouracil in the treatment of acute leukemia, carcinoma of the rectum and colon, carcinoma of the breast, and epithelial tumors in other parts of the body.

6. New applications of old antimetabolites. Here should be mentioned the discovery, eight years after the first proof that folic acid antagonists could cause remissions in acute leukemia in children, that the same substance, methotrexate, was effective in the treatment of choriocarcinoma in females—even after metastasis to the lung and to the bones—with regressions in almost 50 per cent for almost five years in the longest survivor. More recently the application by Sullivan and his colleagues, of the knowledge that the Citrovorum factor is an antagonist to folic acid antagonists, has produced striking temporary disappearance of cancer of the cervix of the uterus when the folic acid antagonist, methotrexate, was administered by artery to the tumor with simultaneous intermittent intramuscular injection of the Citrovorum factor to counteract the toxic effects of the greatly increased amounts of methotrexate employed.

7. Antibiotics. The discovery of the anticancer activity of Actinomycin C in laboratory animals by Hackmann in Domagk's laboratory in Germany, inspired the use of this antibiotic against the lymphomas and some carcinomas in clinics in Germany and in France. Our experimental and then clinical study of Actinomycin D obtained from Selman Waksman, the discoverer of the actinomycins, led to the observation that Wilms's tumor of the kidney could be successfully treated, even after multiple metastases to the lungs, for periods of more than three years after onset of treatment. This is accomplished when Actinomycin D is used simultaneously with the application of small amounts of radiotherapy. Observations such as this promise a new era for the potentiation of radiotherapy by chemical substances. Another antibiotic, Mitomycin C,

discovered by Hata in Japan, has a temporary effect against many different forms of cancer, such as Hodgkin's disease, and rhabdomyosarcoma, and has caused disappearance of pulmonary metastases from an osteogenic sarcoma for as long as two years without evidence of recurrence.

8. Plant extracts. The discovery that an alkaloid called vincaleukoblastine, derived from the periwinkle plant (Vinca rosea Linn), has important anticancer properties emphasizes the possible discovery of anticancer extracts from other plants. Important temporary effects have been produced by this extract against choriocarcinoma which had become resistant to other forms of treatment and against acute monocytic leukemia, Hodgkin's disease, neuroblastoma, and other solid tumors in man. These come from the studies of Noble and Warwick and their colleagues in Toronto, and from Johnson, Hodes, Hertz, and others in this country.

Technics of Cancer Chemotherapy

The recent development, by Creech and his colleagues in New Orleans, of the pump oxygenator in the perfusion of a portion of the body isolated as much as possible from the general circulation, endeavors to bring to the inoperable tumor a higher concentration of anticancer chemical than could be achieved if the therapeutic agent were carried throughout the entire body by the circulation. Perfusions of the limbs, the lungs, the pelvis, the intestinal tract, and the brain have all been carried out. These studies are still too new to permit final conclusions or recommendations. It should be remembered that toxic effects of anticancer chemicals are not restricted to depression of the bone marrow. The deleterious effect on the intestinal mucosa of many anticancer agents is well known, and this is true as well of the spleen and lymphoid tissue and even the brain. What is needed is a means of detoxifying these chemicals, or even better, to develop anticancer agents without toxicity. It may be anticipated that the various technics designed to augment the effect of anticancer chemicals on patients with "incurable" cancer will produce actual cures in selected instances. It is probable that their value will be for selected individuals rather than for all patients with any one form of cancer. Until curative agents are found for the many diseases grouped under the term cancer, refinements in technic are not only justifiable but are to be regarded as laudable efforts when they are chosen primarily for the good of the patient for whom there is nothing more of proved therapeutic value.

Within the last few years, there has been great interest in several countries in the laboratory use and eventual clinical employment of bone marrow transfusion. Attempts have been made by the application of tourniquets to protect the marrow of the extremities from the action of nitrogen mustard administered in amounts larger than those ordinarily employed with safety. A number of investigators have shown that bone marrow may be removed from a patient and returned by transfusion to the same patient a few hours after the administration of larger than the usual therapeutic doses of anticancer chemicals, or reinfused weeks or months later after suitable preservation in a frozen state. These procedures give promise of extending the usefulness of anticancer chemicals now at hand, but they depend upon the availability of sufficient and good marrow in the patient himself. A successful solution to the problems of collection, survival, and usefulness of homologous bone marrow would enhance markedly the effectiveness of carcinolytic agents.

Status of Cancer Chemotherapy in Man

No chemical agent capable of destroying completely all evidences of cancer in all patients with cancer of any one kind has been discovered. A number of chemical agents have been responsible for marked clinical improvement, temporary disappearance of tumor masses,

and important increase in survival. In most instances, the acquisition of drug resistance on the part of the tumor or the occurrence of toxicity caused by high tumor-destroying doses of the drug employed act as limiting factors of serious importance to the patient. Indications of drug specificity have already been demonstrated in the case of some chemicals for some forms of cancer. The full use of our total chemotherapeutic armamentarium combined with the application of total care of a patient with cancer will yield better results than can be obtained when treatment is restricted to any one form of therapy.

From the experience of hundreds of clinical investigators in many countries, a few examples of important clinical improvement caused by chemical agents may be cited. Many other examples could have been selected:

1. The first temporary improvement of advanced cancer of the colon or rectum by any method of treatment has been produced by Curreri and his colleagues in Wisconsin, and now by investigators in other institutions in approximately 50 per cent of the patients to whom 5-fluorouracil or related compounds were administered.

2. Objective improvement, lasting for at least six months, has been produced in 40 per cent of women with advanced breast cancer treated with the same chemical compound.

3. Roy Hertz and his colleagues have produced long-term improvement, with disappearance of metastases from the lungs in almost 50 per cent of women with advanced choriocarcinoma treated with methotrexate. In addition, in these patients so treated who had become resistant after initial response to methotrexate, further important clinical improvement has been obtained in five of eight women treated with vincaleukoblastine.

4. Children, but not adults, with acute leukemia may be returned to what appears to be completely normal health for variable periods of time by means of antimetabolites and corticosteroids. Important increase in survival but no cures are produced by this treatment. Ten per cent of such children are kept alive for more than 32 months, and occasional survivals last from five to eight years.

5. Children with pulmonary metastases from Wilms's tumor of the kidney, treated by Actinomycin D and small amounts of radiotherapy, are still apparently normal and completely free from evidence of tumor for more than three years after discovery of the pulmonary metastases.

6. Hodgkin's disease which has become resistant to radiotherapy may be treated with important temporary success by chlorambucil, cyclophosphamid, vincaleukoblastine, thioTEPA, TEM, and the oldest agent in this group, nitrogen mustard. Recurrent and metastatic cancer of the breast may be treated with at least temporary improvement by means of thioTEPA, 5-fluorouracil, cytoxan, or corticosteroids. The most striking improvement in patients with breast cancer is produced by the use of androgens.

7. Regressions and metastases from cancer of the prostate and important clinical improvement can be obtained by the use of estrogens.

8. Other tumors which have been affected by one or more chemotherapeutic agents include rhabdomyosarcoma, Ewing's tumor, osteogenic sarcoma, seminoma, embryoma of the testis, cancer of the ovary, the liver, the kidney, and tumors of the eye, such as the retinoblastoma. Reese and others have achieved what must be regarded as actual cures in the treatment of retinoblastoma when nitrogen mustard, TEM, or nitromin were employed in conjunction with small amounts of radiotherapy.

9. Of promise, but still in preliminary stages of investigation, is the technic developed by Sullivan, Burchenal, and their colleagues in New York City of intraarterial methotrexate injection into tumors of the head and neck, and the cervix of the uterus, combined with intramuscular injections of citrovorum factor to counteract the toxicity of the very large amounts of the antimetabolite administered. Rapid regression of inoperable epidermoid cancers in these regions have been produced. Time and experience are required to evaluate this new development.

Total Care and the Chemotherapy of Cancer in Man

Since 1947 we have employed surgery, radiotherapy, and chemotherapy whenever possible in the treatment of all patients with cancer as part of the total care of these patients. By total care we mean the use of everything that medicine, surgery, and laboratory science have to offer for the relief of

pain, prolongation of life, and hopefully the cure of patients with cancer. Room has been left in this general policy for the addition to the technics of the surgeon and the radiotherapist of any discovery emanating from research laboratories which can be given with safety for the benefit of the patient with cancer. The majority of cancers have already metastasized demonstrably or microscopically by the time of discovery of the tumor. Cure rates vary greatly from tumor to tumor, varying from close to zero, to close to 100 per cent. It is important that we retain treatment of proved value, and discard nothing until a new method of treatment is discovered, which without question can and should replace the older methods employed.

Our decision in 1947 to add chemotherapy in our own cancer therapy program, whenever possible, to surgery and radiotherapy just as soon as the diagnosis of a solid tumor was made, was based upon the assumption, without experimental proof, that chemical agents which would harm but not destroy a large tumor mass might very well destroy small numbers of circulating cells or small tumor metastases. This policy was based on the further assumption that more effective anticancer agents acting more specifically against one form of cancer or another would become available, and at such time could be inserted into a therapeutic approach which on logical grounds might be expected to improve the therapeutic results produced by surgery or radiotherapy alone. This general plan looked forward also to the possibility of chemical agents acting upon a tumor in such a way as to render an inoperable tumor operable, and included the possibility that radioinsensitive tumors might be rendered sensitive by the action of chemical agents. Both possibilities have been realized as cancer chemotherapy has developed. This plan of attack on cancer, either solitary or disseminated, was sketched in the following terms:

1. Surgical removal of the entire tumor, or as much of it as possible.
2. Radiotherapy, either by conventional or high voltage technics.
3. Administration of chemotherapy—hormones, chemicals, antibiotics, or plant extracts, as indicated by experience or decided by experimental design—preferably from the time of diagnosis in the case of solitary solid tumors.
4. Further surgery or further radiotherapy after chemotherapy, whenever possible or indicated.

Chemotherapy as an Adjunct to Excisional Surgery

Justification for supplementing excisional surgery with cancer chemotherapy was accepted within the past eight years by surgeons in Japan, Germany, Russia, and elsewhere in Europe. In this country surgeons waited for experimental evidence of the increased effectiveness of anticancer agents against small numbers of cancer cells disseminated throughout the body. A number of surgeons, among whom may be mentioned Isidor Ravdin, Warren Cole, George Moore, and Lyndon Lee, and the investigator Michael Shimkin, became advocates of what was called surgical adjuvant cancer chemotherapy. Under the responsibility of Dr. Ravdin and the Cancer Chemotherapy National Service Center staff within the past four years, 39 different university surgery departments and 31 surgical divisions in Veterans Administration Hospitals have been engaged in cooperative clinical studies to evaluate the combined use of chemotherapy begun at the time of surgical excision of tumors of the colon, stomach, lung, breast, and ovary. Dr. Cole had advocated the use of nitrogen mustard at the time of the usual surgical treatment of cancer of the breast. His preliminary studies have already suggested an improvement in survival when combined therapy was

employed from the very beginning. In a recent preliminary report at the meeting of the American College of Surgeons in San Francisco, Dr. Moore spoke informally for the cooperating groups concerned in the study of breast cancer treated by surgery alone, compared with the combination of excisional surgery and thioTEPA. Preliminary analysis by Dr. Moore of the data gathered from the institutions cooperating in this study point clearly to the superiority of the combined method of treatment. For the past four years, for example, we have added Actinomycin D immediately when the diagnosis of Wilms's tumor is made. The tumor is removed in from 24 to 48 hours after diagnosis, and postoperative radiotherapy of the operative site is begun without delay. After completion of the radiotherapy the chemotherapy is continued according to a prescribed plan and further courses are given intermittently for a duration not yet determined, at intervals which are decided upon by the return of the bone marrow and peripheral blood to a normal state.

This approach to cancer therapy must be restricted for the time being to research institutions and cancer centers which are equipped for the task, and should not be employed in the daily practice of medicine. It is based on the assumption that every patient has metastases at the time that an apparently solitary solid tumor is discovered, even though there are no clinical or laboratory evidences of such metastases. The added chemotherapy must be given on as rational a basis as possible, with full safety precautions, in effective amounts and over adequate periods of time, and only by those who are conducting programs of research in this field. These criteria cannot be defined here—this is the task of research groups in the therapeutic and diagnostic cancer institutions equipped for the purpose. If we make the assumption that metastases are already present at the time of diagnosis of a solid tumor, we should add a chemical agent as soon as the diagnosis is made and continue its use during the operative procedure and subsequent radiotherapy, when indicated, and after both of these forms of treatment have been completed. How long such treatment should be carried out must be determined by controlled and carefully designed studies.

It must be emphasized that this treatment of metastases which cannot be demonstrated and which indeed, in many instances, may not be there, must depend upon large experience with the life history and biological behavior of various forms of cancer by those who adopt this approach, and only under conditions which will make certain that dangerous toxic effects from the use of cancer chemotherapy will not occur. The guiding principle must be applied here as elsewhere in medicine, that the treatment for the disease must not be worse than the disease itself, and that the risk imposed in the application of new forms of therapy must not be greater than that for which the disease itself is responsible.

With the realization that cancer chemotherapy is an accomplished fact, and with the recognition of the important accomplishments of individual research groups in many countries, and in our own Cancer Chemotherapy National Program, it is essential to increase the number of diagnostic and therapeutic cancer institutions where expert diagnostic work and clinical investigation can be conducted for the benefit of the patients in all large centers of population. The certain availability of more effective chemotherapeutic agents makes mandatory the existence of institutions throughout the country where these agents may be studied as rapidly and as effectively as possible. Clinical studies are being carried out through the Cancer Chemotherapy National

Service Center on less than 10,000 patients at the present time. It must be remembered that more than 250,000 people will die of cancer this year. There is no question concerning the greater interest in the patient which has been produced by the availability of chemical agents which may be employed in the treatment of patients with advanced cancer. For such a patient and for his family the age of chemotherapy has given renewed hope. Such hope must be defined in terms of scientifically accurate, completely honest statements of the status of research progress in this field, devoid of fanciful interpretation or wishful thinking. The only justifiable encouragement that can be given to the patient with "incurable" cancer and to his family must depend upon the accurate description of the vast increase in the amount of research in the chemotherapy of cancer within the past few years. Encouragement can be gained, too, from the markedly improved means of communication of the results of research between and among the laboratories and clinics which are conducting important work in this field in many parts of the world. The hope can be expressed that unpredictable though the time of research progress may be, it always is possible that important progress will be made in time for this patient. The history of medicine is replete with examples of this kind, and may be drawn upon with accuracy for this purpose.

During the period of time which will elapse before definitive cures for the many diseases grouped under the term cancer will be discovered, the economic problems caused by increased survival of patients with advanced cancer, the social complications, and the greatly increased need for medical care will constitute problems that our society will be called upon to meet and to solve. These problems can be endured and solutions found, only if there is assurance of maximum acceleration of research in the treatment, diagnosis, and prevention of cancer.

In all probability there will be no one agent which will provide a cure for all forms of cancer. It is far more likely that cures will be found one at a time, for one or for a group of these diseases until all forms of cancer have been controlled. And, if in the meantime total prevention or control of cancer can be accomplished by immunization of all mankind against all forms of cancer, so much the better. It is possible, however, and even probable that fundamental research concerning the chemical nature of agents responsible for cancer and for those capable of correcting such a chemical disorder at the very initiation of the cancer-producing process will merge and become one. This would be a satisfying and not too surprising a solution of the centuries-old riddle of cancer. A final word concerning the ultimate purpose of cancer chemotherapy. It is not mere amelioration of symptoms nor simple increase in months or years of survival. It is the control, prevention, and eventual eradication of the many diseases grouped under the word cancer. The final goal of cancer chemotherapy, defined in its broadest sense of both control and prevention, is of particular significance in a meeting held under the auspices of the American Public Health Association. Our final goal then is to remove cancer from the concern of the surgeon, the physician, the radiotherapist, and the pathologist, and to place it in a new setting within the field of responsibility of those concerned with the ultimate control and prevention of disease.

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FIELD APPLICATION OF CANCER CONTROL KNOWLEDGE

John D. Porterfield, M.D., F.A.P.H.A.

WHAT I have to say on this occasion may be likened to the nail driven only part way into the wood. For want of sufficient blows, it remains exposed, subject to rust and failing to meet its intended purpose of providing strength and support. Much of our health knowledge today resembles this. What we know, if properly and fully applied, could go far to reduce disability and premature death. And this is just as true in cancer as in other diseases despite the fact that our knowledge is far from complete. The "nail" of which I speak is indeed a rusty one, but with the application of available tools, it can be driven home—it can strengthen and support community health.

I am, therefore, grateful for this opportunity to speak about the field application of our more recent knowledge in the diagnosis and treatment of cancer. I am the more grateful because I earnestly believe we are now at a point when at least some of this knowledge can be applied in the same way in which you and I and our predecessors have worked and made decisive strides in the control of pellagra, malaria, tuberculosis, and syphilis.

Progress in the control of cancer has been slow and has often been discouraging despite the attack mounted in recent years through research, training, and public education. There have been no comprehensive break-throughs like the immunizing agents recently discovered for poliomyelitis or the therapies like penicillin for syphilis. There have instead been gradual improvements in diagnosis and treatment combined with some advances in prevention through action against recognized carcinogens. This, obviously, is the way it will be since cancer is really not a disease—but a group of diseases.

But before we congratulate ourselves even mildly, let us as Al Smith used to say "look at the record." Let us examine the facts. I shall talk for a moment about the cancer mortality rate in 1949 and 1958—two years widely enough separated to indicate trend but comparable in terms of how deaths were classified. I shall also limit my discussion to age-adjusted death rates for cancer, so that the increasing age of our population will not affect the meaning of the figures.

In 1949 our age-adjusted death rate for cancer per 100,000 population was 125.1. In 1958 it was 126.9. It is obvious that in terms of total death rate we seem to be slowly losing ground.

However, when we consider the cancer death rates for particular sites we can notice gains with respect to certain areas and losses in others. Mortality due to cancers of the digestive system, for example, has fallen from 49.0 in 1949 to less than 43.0 in 1958. There was also some lesser improvement in the death rate for cancer of the genital organs. But these two downward trends were counterbalanced by a growing death rate for cancer of the respiratory system where the rise was more than one-third—from 12.0 to 18.2.

The figures cited above are for the total population. When we look at the figures for males and females we discern still further differentiations in the can-

cer death rates. Females were more favorably situated in 1958 than they were in 1949. But the male cancer death rate increased progressively. This of course is primarily due to the very rapid rise in lung cancer deaths among males. Among females the two areas of real gain have been the reduction in death rate for cancer of the digestive system and of the genital organs, with breast cancer death rates remaining stationary and cancer deaths of the respiratory system rising substantially but not so sharply as among males.

It is apparent that such progress as has been made has been spotty. Our present situation probably results from the interplay of control efforts with unfettered nature in a free-enterprise environment.

There is of course another way of stating the situation in cancer today and that is in terms of individual patients. Fifty years ago a person with cancer had little hope of getting well. Twenty years ago his chances were one in four. Today his chances are one in three. But we know that cancer victims could now be given at least a fifty-fifty break if everything we know about cancer were applied with what the engineer calls an "efficiency utilization" approximating 100 per cent.

So both from the point of view of no improvement in the over-all cancer mortality rate and from the point of view of the ineffective application of what we know, it is obvious that we have a tremendous problem to solve.

A significant part of our problem in cancer control appears to stem from the trends in our civilization and the behavior patterns of its members. If present trends are sustained it would seem that we may continue to expect increases in certain types of cancer incidence and mortality which parallel the increasing urbanization and industrialization of our lives. And if our Public Health Service position on lung cancer is well taken, as I believe it is—that cigarette smoking is implicated as the principal etiologic factor in the increased incidence of lung cancer—we may anticipate an increased occurrence of lung cancer among cigarette smokers, both male and female. In other words, we may have to run ever faster to keep our cancer death rates stationary. This is indeed a grim travesty of the world of Alice-in-Wonderland.

Although we must continue to seek energetically for significant measures of primary prevention, any success within the forseeable future would have great difficulty in counteracting the trends of our megalopolitan, stimulation-seeking society. For now and probably for some time to come, we must rely on our alternate line of defense—the line of secondary prevention, the line of coping with cancer already in being.

Here you might think that the growing panoply of radiological, surgical, and chemical weapons could be applied with immense effect and with great impact on the cancer death rate. But here two factors militate against us: First, we have not yet evolved the community mechanisms which bring cancer patients to diagnosis and treatment before their disease has progressed beyond the cheerless point of no return; and second, the weapons which we do have are all too often not available and if available all too often are not used.

A hopeful kind of secondary prevention is exemplified in the kind of knowledge which we now have with respect to cervical cancer, where an examination, simple for the patient, can set in motion the train of events which provides an almost sure cure for a cancer while it is still in the pre-invasive stage—cancer in situ. Presently uterine cancer, the most frequent site of female genital cancer, kills almost 15,000 women in the United States each year. A great proportion of these deaths might

be prevented by diagnostic and treatment methods now known and generally available.

I said the cytologic test can set a train of events in motion which provides almost sure cure. But as in syphilis, as in tuberculosis, a screening examination is not enough. Disposition of suspects must follow. And in cervical cancer this disposition not only requires expert knowledge but involves many human complexities.

I wish to talk at some length about cervical cancer control because I think the situation in respect to this disease very clearly exemplifies our prospects and our problems.

You all know of the study which was made at Memphis, Tenn., by the National Cancer Institute in cooperation with the University of Tennessee Medical School, the Shelby County Health Department, and the physicians of the area. The project was designed to apply the cytologic examination to a population of 165,000 women. Among the first 108,000 tested, approximately 800 cases of cancer were diagnosed—nearly 1 per cent. Half of these cancers were found in the intraepithelial stage, the other half were invasive. Ninety per cent of the intraepithelial cancers and 30 per cent of the invasive cancers were totally unsuspected. In other words, the study found almost 400 cases of hidden cancer. We are all awaiting the publication of the paper which will tell us how things went with these cases.

A year later one-third of these 108,000 women received a second cytologic examination and 83 additional cases of cancer were diagnosed. But now instead of there being an even division between pre-invasive and invasive cancer, almost 90 per cent of the cancer cases found on the second round were in the sure-cure pre-invasive category.

I shall not presume to attempt a detailed discussion of the Memphis results or of the residual technical problems which still remain, such as the chronology of progression, lack of progression or even regression of the pre-invasive stage. I would merely note that we know that intraepithelial carcinoma of the cervix, carcinoma in situ, exists for a relatively long time—perhaps five or more years—before proceeding, as it too often does, to the invasive stage. And as a result, in Memphis we were able to find a large amount of cervical cancer at a time when it could be successfully treated.

The over-all findings of the Memphis study have now been known for several years and the control efficacy of its screening process is widely recognized—even though this was not the major purpose of the study. It is certainly not unreasonable to ask ourselves the question why each community in the United States has not by now put into operation a similar and continuous program of insuring its female population against the hazard of cervical cancer which cytologic examinations provide.

Speculation leads to several possible answers. First perhaps is the attitude of women themselves. Modesty (even prudishness) may account in part for their lack of interest. I suspect, however, that many are guided or perhaps misguided by the attitude, "It can't happen to me"—a peculiar twist of wishful thinking so characteristic of human nature.

At this point, if you will permit me my memories, I can well recall similar difficulties when we were in the business of serological screening of the population for syphilis. In that era we always made it a point to have community leaders—governors, mayors, churchmen, educators, and others—lead the way. And we were sure to see that their participation was not only visible but publicized. I suggest this approach for your study. Questions of motivation must be approached, however, gingerly.

Another reason for the failure of

secondary prevention in cervical cancer control may relate to the technical requirements in any adequate cytology program. From the patient's point of view the "Pap" smear is simple enough. Its successful use, however, depends upon proper technic, available equipment in the physician's office and the laboratory, well trained cyto-technicians for screening, and qualified professional personnel to verify and interpret doubtful and positive findings. The volume of patients screened must also be sufficient to justify the presence of needed manpower and expense of laboratory equipment.

A third barrier which we must hurdle is the fact that even among the health fraternity secondary prevention has often been lost sight of because of the overwhelming flow of cases for whom very little in the way of prevention can be done and where only palliative care or temporary delay of progression is feasible. It is the hazard which afflicted us in tuberculosis control—so many beds filled with chronic incurable cases that we had no room for the early infectious cases susceptible to short-term intensive therapy.

Moreover, the character of most health insurance programs—which are really just programs to finance sickness and not health insurance at all—reinforce the idea in the community's mind that the smart thing to do is to wait until you get sick and then let someone else pay the bill, particularly since no one seems ready to pay your bill for "merely" preventive service. A little of the energy of those expert in this field could well be devoted to moving the focus of insurance schemes forward in time.

It must be realized, too, that a cytology program is a screening procedure, not a diagnostic measure. It is never complete unless physicians are well versed in the when and how of biopsies and have available the necessary laboratories to examine them. The memory is still green of the hearing loss cases caught in the screen of audiometric testing but "diagnosed" by the dollar watch test.

Among still other reasons is the jurisdictional differences among the several specialties in medicine. This alone may serve as a major hindrance to program development. But it is a fact we live with and it is time we sat down squarely to understanding and working with our next-office neighbor as well as with those further removed from us.

Whatever the problems may be, one or all of those mentioned, and possibly still others, I firmly believe that they are surmountable. The essential requirement is community leadership—the medical profession and our health agencies are the logical sources for initiative, but it is conceivable that even the public can be a primary source of stimulation. Attitudes can be changed as Madison Avenue has well demonstrated. Financial assistance, technical help, public and professional literature, educational materials and programs are available from several sources. Small communities can combine their interests to promote joint services for cancer screening and diagnosis.

I have talked too long on the subject of cervical cancer; nothing has been said about breast, oral, skin, and other types of cancer, some of which are not so readily diagnosed in the early stages as is cervical cancer. I have used this category, however, to raise in your minds the question of why this specific, mass cytologic screening and examination has not taken hold. The same question can be used as a backdrop for your reflections on what you will plan to do in your communities when more important cancer break-throughs come. Is the interest, is the organization, are the services available that will be needed to apply the knowledge—when it comes—for the saving of life, for the maintenance of health?

Although I cannot prophesy the time-

table of achievement in biomedical research, I feel sure that the stream of discovery will continue to grow and expand in the years ahead. Hence, if we cannot even exploit the developmental beginnings which we already have, we certainly cannot anticipate any substantial effectiveness when instead of applying one measure we will face the multitude of measures needed simultaneously to develop many programs.

The fact of our failure to utilize presently functioning mechanisms in the community is clear. What we need of course is partnership: partnership between private and public agencies and facilities; partnership in which nonprofit and governmental groups work hand in hand with the medical profession and with the purveyors of true health insurance; partnership between those elucidating new knowledge and those versed in its use. This partnership is the crucial problem we must solve as public health adapts itself to a complex world.

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SUMMARY

Hugh R. Leavell, M.D., F.A.P.H.A., and Lester Breslow, M.D., F.A.P.H.A.

THE PRESENTATIONS this morning give a sense of the acceleration, the rapidity in the growth of knowledge and power to deal with cancer. The momentum depicted by our speakers—the voice of experience—indicates that it is time for public health workers to join their colleagues in the laboratory and at the bedside in an all-out attack on cancer.

Challenge to Initiative, Not Approach

Before we review what we have heard about the cancer problem and about the existing elements which will aid us in finding the right equations to help solve it, let us give brief recognition to one fact. From what has been said, it is clearly patent that our basic public health approaches to cancer are valid. There is no need for novelty. There is need, however, to advance along these approaches with clearer direction and with firmer step. For, as presented at this symposium, public health's strengthened and major contributions are to come through:

Epidemiology—We must make critical, tough-minded evaluations of the evidence, and insist that data be considered in the framework of the total group of patients and of whole populations;

Public health administration—We must plan and organize services to bring the best care to all the people as rapidly as it becomes available; and

Public health education—We must strengthen our efforts to achieve public understanding and support for further research, prevention, early diagnosis and treatment.

Scope of the Challenge

We have learned that cancer is a disease which comes to the fore in "advanced" nations and urbanized cultures. Our country has a great opportunity not only to solve the problem for our own people, but also to assist other nations now following an industrial course to avoid some of the troubles we are experiencing. Note, though, that research and program in nations abroad are already contributing to the solutions of some of our problems at home.

The size of our national problem with this disease is tremendous. In a year 260,000 people die of cancer, 500,000 contract it, 700,000 are under treatment, which in terms of hospital care alone costs $300 million. The national annual economic loss is close to $12 billion. Of those now living, 40 million will develop cancer and for some 26 million of these it will be recorded as their cause of death.

At the beginning of the seventh decade in our century it is the second leading cause of death. Concomitants of this fact are: the increased life expectancy resulting from control of communicable diseases and infant mortality, better diagnosis, and actual increase of cancer. While the incidence of stomach and uterine cancer has decreased, that of lung cancer has tripled, and that of leukemia has doubled.

Foci of Current Effort, and Parallels

Our developing attack on this disease is patterned after great and successful public health campaigns of the past few

decades—for example, those against syphilis and tuberculosis. True, they are different diseases known to be caused by infectious organisms. But elements of our total effort against cancer now and against these communicable diseases in the past are essentially parallel:

National leadership and support has come from the Public Health Service and from a voluntary group, in this case the American Cancer Society—In 1940 the two organizations between them spent $780,000 on research into the causes and cure of cancer. The National Cancer Institute now spends $110 million and the ACS, $30 million yearly for research. The outlays of state health departments, of those supporting some 10,000 other projects and of hospital treatment programs added to what is spent by NCI and ACS total approximately a billion dollars a year.

Advance of scientific knowledge—The borders of our knowledge in this area have been extended through studies in fundamental biology, chemotherapy, research in viral etiology and evaluation of therapeutic methods, especially radiation. We heard of progress in fundamental biological studies from Dr. Mueller who told us that cancer is a group of diseases identified by biochemically defective cells which evidence "gypsy traits," "juvenile delinquency," "trigger happiness," and no family planning. Much more remains to be discovered about carcinogenesis. Hopefully, quantitative biology through the study of genetics and DNA may supply us with much needed basic information. Dr. Farber told us of the basic efforts of chemotherapy—still somewhat hit or miss—to correct the cells' biochemical defects. At least 20 substances are widely used for this purpose. However, a great need exists for extended clinical, laboratory, and epidemiological studies in the over-all research effort, and for carefully planned programs of surgery, radiotherapy, and chemotherapy.

Growing public concern and understanding evidenced by financial and moral support of efforts—However, human emotions often hinder the full application of what we already know. In the Papanicolaou smear program, for example, modesty, fear, and the attitude that "it can't happen to me," are known deterrents. Certain habits, like cigarette smoking, persist in the face of the increasing knowledge of their hazards. Furthermore, the exhaustive studies which have turned up this information have stepped on industrial toes as a byproduct. Jurisdictional differences among medical specialists and the general absence of health insurance coverage for prevention are additional hindrances to prevention, detection, and early diagnosis.

Professional willingness to proceed with tools at hand—The elements of community leadership are clearly present in devising new mechanisms to lower barriers to prevention, early detection and control, e.g., cervical smear programs and the campaign against cigarette smoking. As we have been reminded, the tools at hand are those basic tools of education, epidemiology and administration which have been tried and not found wanting. The key to their full use is the removal of hindering conditions and the addition of eagerness to "willingness."

The Future

The syphilologist or phthisiologist of 25 years ago—if faint-hearted—might never have joined Tom Parran, Herman Hilleboe, and the others when they were willing to move ahead with the diagnostic and therapeutic tools of that day. Their pioneer work led to the current situation—when it is possible to consider eradication. Cancer may take a bit longer but the promise is there. If,

for example, we were successful in reducing cigarette smoking by 60 per cent, 20,000 might be saved from lung cancer. In 1940 one-fourth of all cancer victims were saved. Now one-third are being saved. We could save one-half. The cancer problem is tremendous and increasing—but not hopeless. Do not forget—there is knowledge available for application Now!

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